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Selective Exposure To Misleading Information In The New Media Environment By At-Risk Youth: A Study Of Pro-Smoking Youtube Videos

Rosie Eungyuhl Bae
University of Pennsylvania, rosie.e.bae@gmail.com

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Abstract

Many pro-smoking videos on YouTube reach view counts in the hundreds of thousands and more. Yet, there is limited information on who is viewing these potentially misleading videos. Based on literature that suggests that positive portrayals of cigarette smoking are prevalent on YouTube and the fact that adolescents, who are the main users of YouTube, can be easily impacted by such misleading depictions, this dissertation focuses on furthering our understanding of pro-smoking videos, using youth (ages 15-21) with varying levels of interest in smoking as main subjects. Specifically, this dissertation is aimed at identifying the viewership and potential impact of smoking promotion YouTube videos. In an attempt to answer the question of who is viewing these videos, Study 1 was a selective exposure experiment that examined browsing patterns of youth who were given a choice set of 16 videos (eight smoking and eight non-smoking). Behavioral data revealed that youth with high interest in smoking were more likely to select and spend more time watching pro-smoking videos than were youth with lower interest in smoking. A secondary finding was that when given the impression that smoking videos were popular by manipulating view count, youth held more positive attitudes toward smoking. Study 2 examined post-exposure data collected as part of the selective exposure study. Correlational results showed that there was a significant positive association between selection of pro-smoking videos and smoking-related outcomes such as norms and attitudes. Youth with high interest in smoking also had more positive reactions to pro-smoking videos compared with their less interested counterparts. To establish directionality of the relationship between exposure and persuasion, Study 3 examined whether there were any direct effects of exposure to pro-smoking videos on smoking-related outcomes for youth interested in smoking. Contrary to expectations, there was no evidence that exposure to pro-smoking videos negatively impacted smoking-related outcomes. Therefore, an intervention to correct or inoculate against pro-smoking videos was not necessary, negating the need for a correctives study that had originally been proposed as part of this dissertation. Possible explanations for the findings are discussed along with implications and future directions for research.

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SELECTIVE EXPOSURE TO MISLEADING INFORMATION IN THE NEW MEDIA ENVIRONMENT BY AT-RISK YOUTH: A STUDY OF PRO-SMOKING YOUTUBE VIDEOS

Rosie Eungyuhl Bae

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Supervisor of Dissertation

_____

Joseph N. Cappella, Gerald R. Miller Professor of Communication

Graduate Group Chairperson

_____

Joseph Turow, Robert Lewis Shayon Professor of Communication

Dissertation Committee

Robert C. Hornik, Wilbur Schramm Professor of Communication and Health Policy

John B. Jemmott III, Kenneth B. Clark Professor of Communication and Psychiatry

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ABSTRACT

SELECTIVE EXPOSURE TO MISLEADING INFORMATION IN THE NEW MEDIA ENVIRONMENT BY AT-RISK YOUTH: A STUDY OF PRO-SMOKING YOUTUBE VIDEOS

Rosie Eungyuhl Bae

Joseph N. Cappella

Many pro-smoking videos on YouTube reach view counts in the hundreds of thousands and more. Yet, there is limited information on who is viewing these potentially misleading videos. Based on literature that suggests that positive portrayals of cigarette smoking are prevalent on YouTube and the fact that adolescents, who are the main users of YouTube, can be easily impacted by such misleading depictions, this dissertation focuses on furthering our understanding of pro-smoking videos, using youth (ages 15-21) with varying levels of interest in smoking as main subjects. Specifically, this dissertation is aimed at identifying the viewership and potential impact of smoking promotion YouTube videos. In an attempt to answer the question of who is viewing these videos, Study 1 was a selective exposure experiment that examined browsing patterns of youth who were given a choice set of 16 videos (eight smoking and eight non-smoking). Behavioral data revealed that youth with high interest in smoking were more likely to select and spend more time watching pro-smoking videos than were youth with lower interest in smoking. A secondary finding was that when given the impression that smoking videos were popular by manipulating view count, youth held more positive attitudes toward smoking. Study 2 examined post-exposure data collected as part of the selective exposure study. Correlational results showed that there was a significant

positive association between selection of pro-smoking videos and smoking-related outcomes such as norms and attitudes. Youth with high interest in smoking also had more positive reactions to pro-smoking videos compared with their less interested counterparts. To establish directionality of the relationship between exposure and persuasion, Study 3 examined whether there were any direct effects of exposure to pro-smoking videos on smoking-related outcomes for youth interested in smoking. Contrary to expectations, there was no evidence that exposure to pro-smoking videos negatively impacted smoking-related outcomes. Therefore, an intervention to correct or inoculate against pro-smoking videos was not necessary, negating the need for a correctives study that had originally been proposed as part of this dissertation. Possible explanations for the findings are discussed along with implications and future directions for research.

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CHAPTER I |

INTRODUCTION

With few restraints to the diffusion of inaccurate and misleading information, the new media have created a myriad of opportunities to generate content, increasing availability not just of information but also of *mis*information. This environment has led to an explosion of options from which audiences can choose.

One such platform where this is prevalent is YouTube, an interactive video-sharing platform in which users can upload, watch, and share videos. As the second most viewed website on the Internet (Alexa, 2016), YouTube is home to more than a billion users (YouTube, 2016). Perhaps due to YouTube's accessibility and convenience when it comes to posting content, research has documented that harmful health-related information is quite pervasive on YouTube – whether it be pro-anorexia videos (Syed-Abdul et al., 2013), anti-vaccination videos (Briones, Nan, Madden, & Waks, 2012; Keelan, Pavri-Garcia, Tomlinson, & Wilson, 2007), videos with weight-based teasing (J. H. Yoo & Kim, 2012), or videos containing false or misleading recommendations related to skin cancer prevention (Ruppert et al., 2017). To make matters worse, across these topics, studies reveal that problematic videos tend to be more popular, bring about more audience engagement, and have greater probability of becoming viral (Briones et al., 2012; Keelan et al., 2007; Syed-Abdul et al., 2013; J. H. Yoo & Kim, 2012).

Acknowledging the presence of health-related misinformation on YouTube, this dissertation specifically focuses on misleading, positive portrayals of cigarette smoking on YouTube. The tobacco industry has long propagated false and misleading positive

claims related to smoking as a way of advertising and selling their products (Cummings, Morley, Horan, Steger, & Leavell, 2002; Jarvis & Bates, 1999; *United States v. Philip Morris USA, Inc.*, 2006). While they deny involvement in using new media technologies to promote their products (Turtle, 2007), more problematic, perhaps, is that misinformation related to smoking is no longer only in the hands of the tobacco industry.

Smoking Imagery on YouTube

Studies show that smoking imagery on YouTube is "prolific and easily accessed," and that such readily accessible videos contain potentially misleading information related to smoking (Forsyth & Malone, 2010, p. 810; Freeman & Chapman, 2007; K. Kim, Paek, & Lynn, 2010). According to Forsyth and Malone (2010), videos containing positive smoking imagery outnumber videos containing negative smoking imagery. Because of the prevalence of pro-smoking messages online and their potential to create positive associations with smoking, some have suggested a need for regulatory practices (Freeman & Chapman, 2007; K. Kim et al., 2010).

Pro-smoking content on YouTube may be a special problem for adolescents and young adults who are the primary users of YouTube. According to Pew Research Center (2015), YouTube reaches 82% of 18- to 29-year-olds, more than any cable network in the United States (YouTube, 2016). Adolescence is also a time when smokers actively experiment with and establish smoking as a habit. The Surgeon General reports almost nine out of ten smokers initiating smoking by age 18 (U.S. Department of Health and Human Services, 1994, 2012, 2014). This age group is characterized by psychosocial risk factors such as comparison with peer groups and sensitivity to peer pressure such that if they overestimate the prevalence of smoking among peers – which may be a natural

response when they are exposed to such pro-smoking videos – it may have detrimental effects (Grandpre, Alvaro, Burgoon, Miller, & Hall, 2003).

Aside from anti-smoking videos, the most often viewed videos are images of people smoking, smoking fetish videos, comedy clips, or cigarette tricks videos (Freeman & Chapman, 2007), many of which have the potential to attract younger audiences and contain misinformation. Similarly, in their study of tobacco brand-related YouTube videos, Elkin and colleagues (2010) found that the most prominent themes were youth appealing themes such as celebrity/movies, sports, and music (Elkin, Thomson, & Wilson, 2010). Past research has shown that exposure to smoking on entertainment media and positive media portrayals of smoking can be associated with smoking initiation among adolescents (e.g., Charlesworth & Glantz, 2005; Sargent, Gibson, & Heatherton, 2009). Likewise, YouTube viewers may vicariously form positive outcome expectations about the short-term social benefits of smoking while ignoring the long-term health consequences, which is often characteristic of youth who initiate smoking (Halpern-Felsher, Biehl, Kropp, & Rubinstein, 2004; K. Kim et al., 2010).

Overview of Dissertation

Based on the literature that suggests that positive portrayals of cigarette smoking are abundant on YouTube and the fact that adolescents, who are the main users of YouTube, can be easily impacted by such misleading depictions, this dissertation focuses on pro-smoking YouTube videos, using at-risk youth (ages 15-21) with varying levels of interest in smoking as main subjects. While pro-smoking videos on YouTube are popular, with some reaching view counts in the hundreds of thousands and more, there is limited information on the viewership and potential impact of these videos.

In an attempt to better answer the first question of who it is that is viewing pro-smoking videos, a selective exposure experiment was conducted with a national sample of youth to see if interest in smoking affected selection patterns (Study 1). Study 1 found that youth with high interest in smoking were more likely to select a greater number of pro-smoking videos as well as watch them for longer periods of time compared with youth with low interest in smoking. Next, in an attempt to answer the second question of potential impact of pro-smoking videos, Study 2 examined post-exposure data collected as part of Study 1 to see if selection of pro-smoking videos was associated with smoking-related outcomes. Correlational results showed that selecting pro-smoking videos was associated with more positive norms and attitudes related to smoking, and that youth with high interest in smoking had more favorable evaluations of pro-smoking videos compared with their counterparts. Because directionality of the effects was unclear, an experimental study was conducted to examine if exposure to pro-smoking videos had any immediate negative effects on smoking-related outcomes (Study 3). Results were not significant – there was no evidence that pro-smoking videos were persuasive for at-risk youth. Originally, I had proposed to conduct a correctives study using anti-smoking PSAs as YouTube in-video advertisements in an attempt to combat misleading information contained in pro-smoking videos, but given that Study 3 did not find any significant results, this negated the need for such an intervention. Possible explanations for the findings are discussed in the last chapter, along with potential policy implications and future directions.

CHAPTER II |

STUDY 1 - DOES INTEREST IN SMOKING AFFECT YOUTH SELECTION OF PRO-SMOKING VIDEOS? A SELECTIVE EXPOSURE EXPERIMENT[*]

This chapter examines the question of whether at-risk youth are more likely to view pro-smoking videos. Because youth are the primary users of YouTube and this group tends to be overly optimistic about the health costs and ease of quitting smoking, a deeper understanding of pro-smoking videos on YouTube and their viewership is warranted. If those exposed to misleading videos are among those more susceptible to start, increase, or sustain smoking, then the potential impact of these online materials would be particularly problematic. Although prior studies have examined the presence and prevalence of pro-smoking messages online (e.g., Hong & Cody, 2002; Ribisl, 2003) and probed into the content of these messages (e.g., K. Kim et al., 2010), there is insufficient knowledge about the characteristics of individuals who seek out such content.

This problem is a practical but an important one: Are youth at high risk for smoking more likely to watch videos that depict smoking in a positive light? If only low risk youth are exposed, the concern would remain but would be less immediate. Lazarsfeld and colleagues (1944) noted that "predispositions lead people to select communications which are congenial, which support their previous position" (p. 89). In

[*] This is a pre-copyedited, author-produced version of an article accepted for publication in *Nicotine & Tobacco Research* following peer review. The version of record [Bae, R. E., Maloney, E. K., Albarracín, D., & Cappella, J. N. (2018). Does interest in smoking affect youth selection of pro-smoking videos? A selective exposure experiment. *Nicotine & Tobacco Research*. doi:10.1093/ntr/nty037] is available online at: https://doi.org/10.1093/ntr/nty037.

line with this notion, selective exposure to pro-smoking content has the potential to further strengthen individual biases associated with smoking.

Selective Exposure

Selective exposure is conceptualized as "any systematic bias in audience composition for a given medium or message, as well as any systematic bias in selected messages that diverges from the composition of accessible messages" (Knobloch-Westerwick, 2015a, p. 3). Individual predispositions affect selection of messages such that selection is nonrandom. Festinger's (1957, 1964) theory of cognitive dissonance provided the groundwork for selective exposure research. Arguing that people have a natural tendency towards consistency and that the presence of inconsistency results in psychological discomfort, Festinger (1957, 1964) stated that selective exposure to information is a result of an avoidance of information and situations that heighten dissonance. The selective exposure hypothesis thus makes a two-sided prediction that there is not only a bias to seek out attitude congruent information but also a selective avoidance of attitude incongruent information (Brannon, Tagler, & Eagly, 2007; Frey, 1986).

A meta-analysis synthesizing 67 studies of selective exposure by Hart and colleagues (2009) found that a moderate congeniality bias ($d = 0.36$) exists. In other words, there seemed to be a tendency for individuals to select information that confirmed – rather than challenged – their existing beliefs, attitudes, or behaviors. Using the framework of motivated information processing by Chaiken, Liberman, and Eagly (1989), the review distinguished between defense motivation and accuracy motivation (Hart et al., 2009). *Defense motivation* assumes that individuals engage in motivated

reasoning to either defend their existing attitudes, behaviors, and beliefs due to an experience or anticipation of dissonance; *accuracy motivation* enhances elaboration of attitude-relevant information because individuals want to accurately appraise the information in an open-minded fashion (Chaiken et al., 1989; Hart et al., 2009).

Past studies of selective exposure with smokers have primarily investigated whether smokers select or avoid dissonance-evoking messages such as "smoking leads to lung cancer" compared with non-smokers. Feather (1962, 1963) found no difference among smokers and non-smokers in their interest in reading material supporting the smoking-lung cancer relation and concluded that informational utility surpassed their motivations to avoid dissonance. However, later studies found that when smokers and non-smokers were given an alternative choice, such as an article titled "smoking does not lead to lung cancer," in addition to an article titled "smoking leads to lung cancer," smokers preferred the first article whereas non-smokers preferred the second (Brock, 1965). Extending upon this study, Brock and Balloun (1967) found that when participants had to actively press a button to listen to a recorded message more clearly, smokers made more attempts to listen to the attitude-consonant message than the attitude-dissonant message.

Whereas previous studies of selective exposure with smokers have focused on avoidance of anti-smoking messages or messages that are uncongenial to smokers, the present study examines whether potential smokers selectively seek out pro-smoking messages that potentially reaffirm their pre-existing beliefs, attitudes, and behaviors. Based on the congeniality bias, a person whose self-concept or identity is tied to smoking will be more likely to select a pro-smoking message (Knobloch-Westerwick, 2015a). On

the other hand, a person that has low interest in smoking will be less likely to select a pro-smoking message because it is less important to their identity. Consistent with this reasoning, it is worth noting that the previously described studies by Brock and colleagues (Brock, 1965; Brock & Balloun, 1967) essentially compared a misinformation claim about smoking against an accurate one and found that smokers were more inclined to view the misinformation claim that is less dissonance provoking (i.e., less challenging to their smoking behavior).

Informational utility could also play a role in pro-smoking video selection. The utility motive has long been tied to selectivity (Freedman & Sears, 1965; Katz, 1968). The prediction is that if the information being provided is sufficiently useful, it will be selected regardless of its congeniality to the selector (Katz, 1968). For instance, studies on news stories have shown that, in general, articles that are high in informational utility tend to have a selective advantage (H. S. Kim, 2015; Knobloch-Westerwick, Dillman Carpentier, Blumhoff, & Nickel, 2005). However, for more specific topics such as smoking, informational utility may be different, based on peoples' level of interest in the topic. For individuals who have low intentions to initiate smoking, pro-smoking content would probably have very low utility. Therefore, we believe that selection patterns of pro-smoking videos would be different as a function of individual levels of interest in smoking. A study of pro-tobacco advertisements found that adolescents who were susceptible to smoking reported higher levels of exposure to pro-tobacco advertisements than non-susceptibles (Dube, Arrazola, Lee, Engstrom, & Malarcher, 2013). Given that pro-smoking videos are both congenial and have high informational utility for to individuals who are more likely to smoke in the first place, we hypothesize that:

H1-3: Pro-smoking videos will be viewed (1) more often, (2) earlier, and (3) longer by youth with high interest in smoking than youth with low interest in smoking.

Social Influence and Youth

The motivations for studying how social influence affects selective exposure patterns are twofold given our interest in content that exists in the new media environment and our interest in the behavior of younger populations. Research has shown that adolescents are especially susceptible to social influence, which in turn affects risk assessments and behaviors (see L. J. Knoll, Magis-Weinberg, Speekenbrink, & Blakemore, 2015; Maxwell, 2002; Prinstein, 2001).

Peer influence has long been tied to risky health behaviors such as smoking, alcohol use, and drug use among adolescents (e.g., Lynskey, Fergusson, & Horwood, 1998). Existing studies on social influence in the new media environment have yet to focus exclusively on younger populations and their selective exposure patterns to potentially risky material. We believe this study will help to fill this gap.

One related study by Sherman and colleagues (2016) found that adolescents were more likely to "like" a photo that was more popular (i.e., had more likes), even when the photo depicted risky behaviors such as smoking or drinking (Sherman, Payton, Hernandez, Greenfield, & Dapretto, 2016). Functional MRI (fMRI) results revealed that neural regions implicated with social cognition and reward processing showed greater activation when viewing photos that were popular (23 to 45 likes) versus unpopular (0 to 22 likes). The study also found that viewing risky behavior photos posted by peers was associated with

deactivation of the cognitive control network (Sherman et al., 2016). This suggests that social endorsements impact how information is processed, even for risky material.

With user-generated videos, peer influence may come from two sources: (a) the people who post and star in the videos, who are "like them," with whom viewers identify, and (b) social endorsements that indicate how the video is being evaluated by others. Social endorsements, however, are what make social influence potentially consequential online. Therefore, the present study examines how social endorsements affect selective exposure to risky material – specifically, pro-smoking content – by manipulating social influence with view count such that smoking videos are either popular (i.e., with higher view counts) or unpopular (i.e., with lower view counts).

Several empirical findings (H. S. Kim, 2015; Knobloch-Westerwick, Dillman Carpentier, et al., 2005; Knobloch-Westerwick, Sharma, Hansen, & Alter, 2005; Sundar & Nass, 2001; Winter, Metzger, & Flanagin, 2016) illustrate that in the case of news selection, social endorsements are important, sometimes to the point that they trump partisan source cues (Messing & Westwood, 2012). This bandwagon effect (Sundar & Nass, 2001) was similarly found in other domains such as in the selection of online video clips (Fu, 2012) or songs (Salganik, Dodds, & Watts, 2006). This could also be the case for pro-smoking videos. Another possibility is that view count has differential effects on selection of pro-smoking videos, based on interest in smoking. While people with little interest in smoking may use social endorsements as a heuristic cue in selecting pro-smoking videos, people with high interest in smoking may be motivated to select pro-smoking videos – regardless of view count. Because little is known about the influence of social endorsements on selective

exposure to risky content and how this interacts with personal identity, the following questions are put forth:

RQ1: Does view count affect selective exposure to pro-smoking videos?

RQ2: Does view count have different effects on selection of pro-smoking videos based on interest in smoking such that youth with low interest in smoking will be more influenced by view counts than youth with high interest in smoking?

RQ3: Does view count affect perceived social norms about smoking?

RQ4: Does view count affect attitudes toward smoking?

Method

Subjects

A national convenience sample of 614 U.S. adolescents and young adults between the ages 15 and 21 was recruited through an online research panel, Toluna (www.toluna-group.com), a survey company that maintains an online youth panel with parental permission. A measure proposed by Pierce and colleagues (1996) was used to recruit a range of participants with varying levels of interest in smoking (Pierce, Choi, Gilpin, Farkas, & Merritt, 1996).[1] Tapping into youth's intentions, self-efficacy to refuse a cigarette offer by their peers, and curiosity related to smoking, this validated measure was found to be a strong predictor of experimentation with smoking and future smoking onset in a national longitudinal study (Pierce, Choi, Gilpin, Farkas, & Berry, 1998; Pierce et al., 1996). Youth with no interest in smoking are those who (a) do *not* think they will try a cigarette soon, (b) will *definitely not* smoke a cigarette if one of their best friends were to

[1] Note that we used smoking interest as a quota because of limitations in using smoking behavior as a quota for underage participants.

offer them, and (c) will *definitely not* be smoking cigarettes one year from now. All other youth who indicated otherwise (i.e., "the absence of a firm decision not to smoke"; Pierce et al., 1996, p. 355) were considered as having some level of interest in smoking. This smoking interest measure (described further in the *Measures* section) was used as a quota to sample a 1:1 ratio of participants with complete disinterest in smoking and participants with some level of interest in smoking.

Recruited participants were randomly assigned to one of three conditions. Table II-1 lists the demographic breakdown of the sample. Overall, 59.9% of the sample were female, 66.4% were White, 13.5% were Asian, 8.5% were African American, 7.8% were more than one race, and 3.7% were of another race. There were no significant differences in demographic features, personality traits, or interest in smoking across conditions.

Table II-1. Participant Demographics and Characteristics

	Condition			
	1 (n = 173)	2 (n = 223)	3 (n = 218)	Overall (N = 614)
% Female	62.4%	61.5%	56.2%	59.9%
M_{age} (SD)	17.87 (2.00)	17.73 (1.95)	17.80 (1.76)	17.79 (1.90)
% Non-White	45.7%	47.1%	42.9%	45.2%
% Interested in smoking	49.7%	52.9%	45.9%	49.5%

Note. There were no significant differences across conditions.

Stimulus Material

A total of 64 videos were used as experimental stimuli: 32 smoking videos and 32 non-smoking videos (see Appendix A for a full list of videos). For each participant, eight smoking videos and eight non-smoking videos were randomly sampled (described in the "smoking videos" and "non-smoking videos" sections below). Videos were sampled from

each subcategory so that participants will be faced with video choice options that are representative of the different formats of smoking videos available on YouTube. None of the videos were age-restricted or restricted to certain viewers at the time they were collected so that all videos were available to anyone who visited YouTube.

Smoking Videos

Stimulus smoking materials were a subset of videos collected by the Annenberg Public Policy Center (APPC) of the University of Pennsylvania. The search API was used to gather videos on YouTube using 136 tobacco-related search keywords (e.g., "smoking+stress," "celebrity+smoker," "inhale+tobacco," "smoke+tricks"). From this, undergraduate research assistants narrowed down the pool to cigarette smoking-related videos that were pro-smoking (i.e., videos that contained positive portrayals of cigarette smoking). The final set of stimulus smoking materials was selected based on researcher consensus on how misleading or factually incorrect the videos were (see Appendix B for more details about the pro-smoking videos selected for this study). Based on the content and format of the videos, three categories were created so that participants could be faced with video choice options that are representative of the different formats of smoking videos available on YouTube.

Social acceptance smoking videos consisted of videos that emphasize the social rewards of smoking and promote norms that smoking is common and/or socially approved of. *Tutorial smoking videos* included videos of people giving instructions related to how to smoke cigarettes that implicitly encourage smoking, for instance, as a form of rebellion, or to receive some type of benefit. *Testimonial smoking videos* contained pro-smoking videos in which people speak directly to the camera on the topic

of smoking. These videos contain the most explicit misinformation about smoking. Lastly, user-generated *anti-smoking videos* were also included to see if some participants (e.g., youth who are genuinely just interested in smoking and have yet to make up their mind about it) are selecting videos that are about smoking – regardless of valence. It was apparent that the videos had smoking content from the thumbnail images and/or the video titles. The subcategories of smoking videos are outlined in Table II-2.

Table II-2. Subcategories of Smoking Videos

Category	Explanation
Social acceptance smoking videos	Pro-smoking videos; Videos that emphasize the social rewards of smoking and promote a descriptive and injunctive norm that smoking is common and/or socially approved of. Examples include videos that show multiple individuals who smoke that suggest that smoking is normative, videos that depict groups of attractive individuals smoking, and videos of socially rewarded cigarette tricks (in front of applauding or cheering peers).
Tutorial smoking videos	Pro-smoking videos; Videos of people giving instructions related to how to smoke cigarettes that implicitly encourage smoking, for instance, as a form of rebellion, as a way to be perceived in a certain way, or as a way to receive some type of benefit. Examples include videos telling people how to buy cigarettes underage, how to look cool while smoking, and how to get the maximum (enjoyment) out of smoking.
Testimonial smoking videos	Pro-smoking videos; Videos in which people speak directly to the camera on the topic of smoking. These videos contain the most explicit misinformation or misleading claims about smoking. Examples include a woman claiming that smoking light cigarettes with filters is akin to smoking "half a cigarette and half air," a man claiming that warning labels on cigarettes are due to "a few small religious groups who pushed for it because they are opposed to smoking" and claiming it is unlawful.
Anti-smoking videos	Anti-smoking videos; User-generated videos that portray smoking negatively (e.g., testimonials about quitting smoking). User-generated videos are used instead of professionally produced anti-smoking PSAs to make this set of videos comparable to others.

Non-Smoking Videos

All non-smoking videos were selected to appeal to a younger audience (given sample characteristics) and to both genders. This was determined by the age of the person(s) in the video and the topic of the video. Non-smoking control videos were topically matched to the format of pro-smoking videos (i.e., *social acceptance, tutorial,* and *testimonial*). These videos did not contain any risky or unhealthy behavior.

A separate category of *risky behavior videos* depicting risky behaviors that are not illegal (e.g., bungee jumping, skydiving) as well as risky behaviors that are illegal and similar to smoking (e.g., teenage alcohol consumption) was created to control for the possibility that participants are selecting videos that are of risky behavior in general and not necessarily because the videos contain smoking.

Results of a pilot study indicated that our pool of non-smoking videos would be selected by members of the target population, offering partial evidence that these videos appeal to youth. Table II-3 lists the titles (and hyperlinks) of videos per category.

Table II-3. List of Videos (with hyperlinks)

Format	Topic: Smoking	Topic: Non-Smoking
Social acceptance	1. How To Smoke a Cigarette 2. Justin Bieber Sexy Schoolgirls Smoking 360p 3. Hollywood/Celebs Smokers 4. Supermodels Smoking 5. Pete Firman's Illegal Smoking Trick 6. KC smokes a whole cigarette in record time 7. man smokes a whole cigarette in one drag 8. 1 cigarette 1 drag	1. Random Girl in the mall blows everyone away at the karaokemachine singing Whitney Houston 2. How to get more followers on Instagram (without follow for follow) 3. BEST CLASSROOM APRIL FOOLS PRANK EVER 4. Cutest Promposal Ever! Pella High School Senior Boys Dance to One Direction! 5. "Burritozilla" killed in under 2 Minutes! 6. Suns Fan Hits $77,777 Halfcourt Shot! 7. How to Flirt With A Guy Thru Text 8. Sweet 16 Court Dance + Father & Daughter Battle
Tutorial	1. How to Hide smoking & the smell 2. How to Buy Smokes Under-Age - (63) Days of Summer 3. How To Look As Cool As Possible. (While smoking a cigarette) 4. How to smoke a cigarette (like a lady) 5. How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) 6. How to smoke a cigarette! 7. How to Smoke A Cigarette 2012 Spencer Hall 8. Remove FSC Chemical From Your Cigarettes	1. 10 HOUSEHOLD PRANKS - HOW TO PRANK 2. How to screen print your own t-shirts 3. My Study Tips & Tricks! + How to Stay Organized! 4. How to make your pc/laptop run faster (3 simple steps) 5. How to Solve the Rubik's Cube! (Beginner Method) 6. How to Pack a Carry-On in 5 Minutes or Less 7. How I Edit Minimal Instagram Photos 8. How to Use Chopsticks Tutorial
Testimonial	1. Marlboro Red - Q&A with DansCigReview 2. My Cigarette Story 3. smoking a cigarette q&a 4. Warning Labels on Tobacco Products - RANT 5. SMOKING IS COOL! 6. SMOKING IS COOL. 7. Smoking is good for you! Rant. 8. The Pros of Smoking Cigarettes	1. Meditation | My personal experience and routine 2. Working at Starbucks 3. MY JOURNEY THROUGH MEDICAL SCHOOL | #4 Medical School Series | AdannaDavid 4. Studying Abroad: My Experience + Photos! 5. ♡ My Homeschool Experience ♡ | My Whole Life 6. MY COMING OUT STORY! 7. My Experience Traveling Alone | Lana 8. MOVING OUT OF HOME FOR THE FIRST TIME! My Advice
Other	*Anti-smoking videos* 1. 5 Weird Reasons Not to Smoke 2. How To Quit Smoking 3. Don't Smoke 4. Quit Smoking Prank! 5. My Quitting Smoking Story 6. 5 Best Tips to Quit Smoking Now and Forever 7. My Boyfriend Smokes & I Hate Smoking - Sexy Times With Gurl 8. 2 years after quitting smoking	*Risky behavior videos* 1. Epic Bungee Jumping in the California Wilderness!! 2. Laie Point Cliff Jumping- Nectar 3. Top 20 Most Dangerous Stunts in world 4. Bungy Jumping Party! Behind The Scenes in New Zealand! 5. Girls Getting Drunk 6. Teenage girls getting drunk in the park 7. Drunk teens 8. FIRST TIME EATING WEED COOKIES!!!

Design

All procedures were reviewed and approved by the Institutional Review Board at the University of Pennsylvania, at which the study was conducted. To address our main hypotheses concerning smoking interest and whether it affects selection of pro-smoking videos, we measured smoking interest at the beginning of the study, prior to the browsing phase. To address our secondary research questions regarding social influence as a factor of selective exposure to pro-smoking videos, we experimentally manipulated view count, and participants were randomly assigned to one of three conditions. In Condition 1, the *no-view-count-comparison condition*, there was no view count information. In Condition 2 or the *smoking-high-views condition*, all of the eight smoking videos that participants were randomly assigned had high view counts and all of the eight randomly assigned non-smoking videos had low view counts. Lastly, in Condition 3 or the *smoking-low-views condition*, smoking videos received low view counts and non-smoking videos received high view counts. For each participant, each video was given a randomly assigned value of view count so that view count and video were not confounded. Precisely, videos that were in the "high view count" category received a view count number that was taken from the top 20% of actual YouTube videos selected from the study (range: 575,877 to 47,274,402) and videos that were in the "low view count" category received a view count number from the bottom 20% of YouTube videos selected for this study (range: 8,650 to 34,747). All low and high view count numbers used for the study are listed in Table II-4.

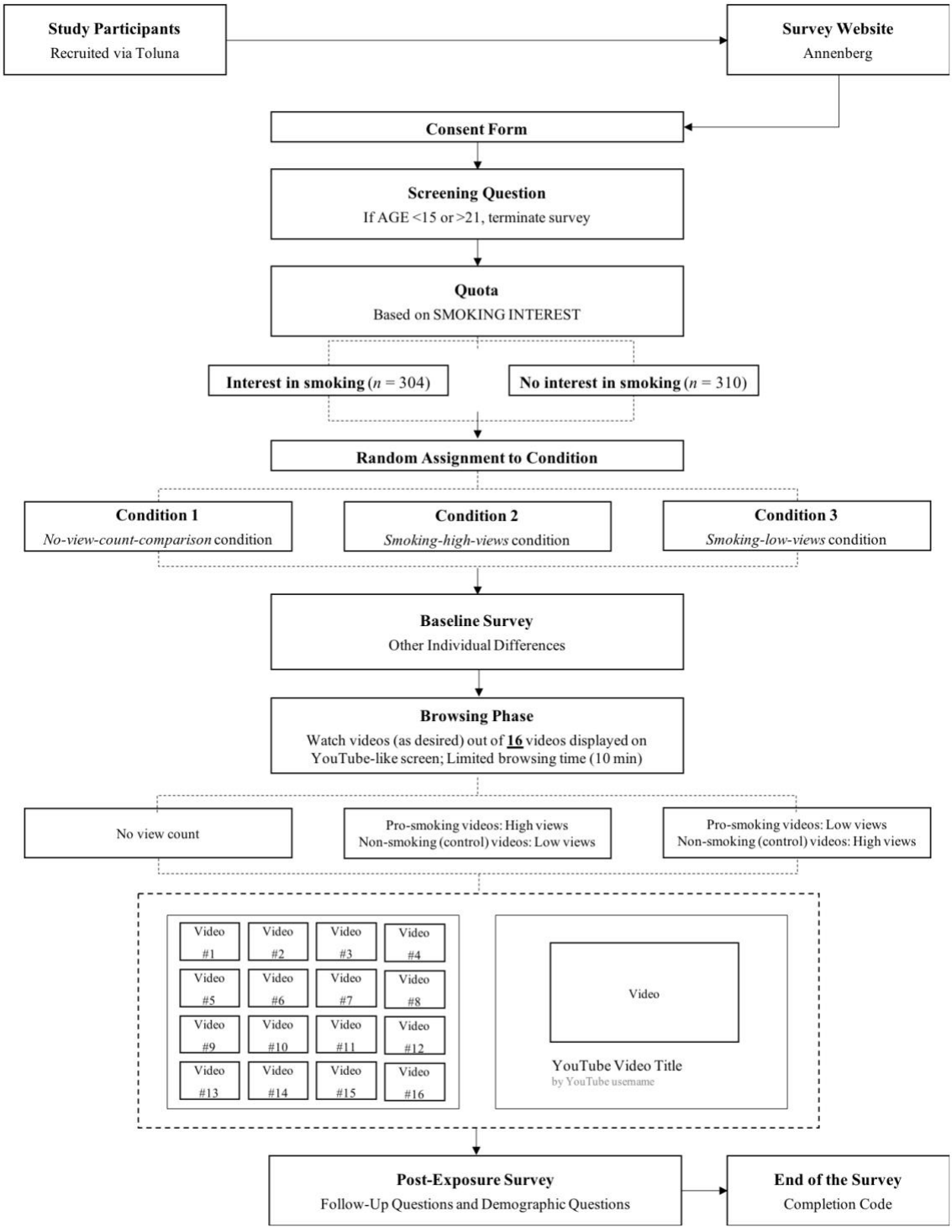
Table II-4. View Count Breakout

Low view count	High view count
8,650	575,877
9,557	594,597
13,866	728,754
14,884	1,369,355
16,368	2,007,722
18,633	2,692,706
19,047	3,470,542
22,324	4,732,868
22,853	6,078,977
23,793	8,594,612
28,719	10,493,239
29,146	25,302,111
34,747	47,274,402

The survey company recruited participants by emailing eligible panel members a survey link. After providing informed consent, participants answered screening questions on age and smoking interest to confirm eligibility in terms of our predetermined demographic quotas. All eligible participants were then randomly assigned to one of the three conditions. Procedures for all conditions were identical except for the presence and absence of view count information. Figure II-1 illustrates the procedure of the study.

Participants first completed a pre-test questionnaire that assessed personality traits such as sensation seeking, regulatory focus, belonging to a social group, social comparison orientation, need for cognition, and need for affect. To keep participants from guessing the purpose of the study, foil questions (e.g., social media use questions) were asked along with questions on personality characteristics. Next, participants entered a browsing phase where selective exposure patterns were recorded.

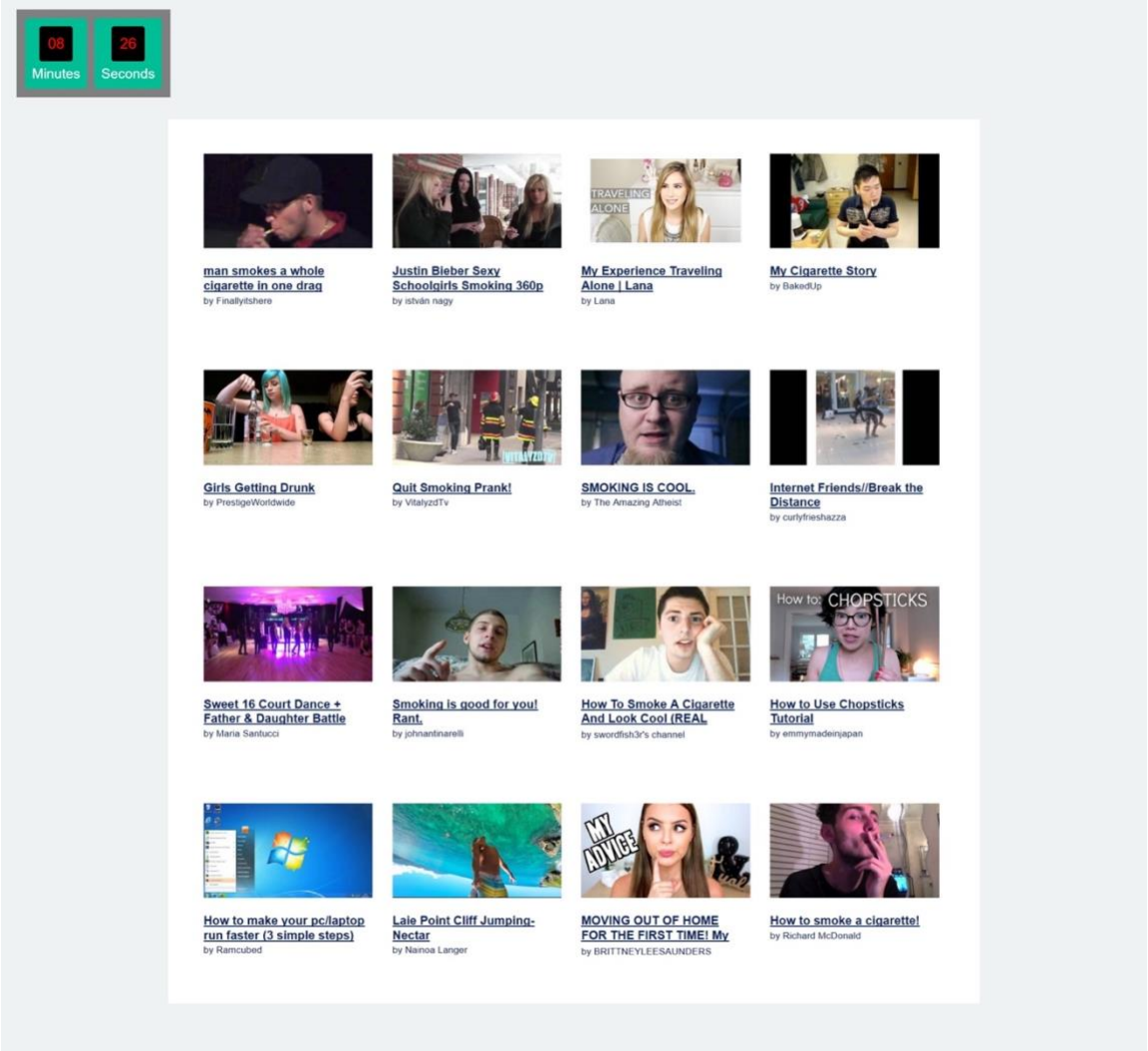
Figure II-1. Study 1 Procedure Flow Chart



Browsing Phase

During this time-restricted phase, each participant was shown a YouTube-like browsing page with 16 randomly selected videos (eight smoking and eight non-smoking). The order in which the videos were displayed on the browsing screen was randomized for each participant to minimize positional effects. Participants could play and stop any video of their choice. Although the literature recommends that the time span be limited so that a third to half of the messages can be consumed (Hastall & Knobloch-Westerwick, 2013), given that stimuli were videos that took relatively longer to view, browsing was restricted to 10 minutes. The average length of the videos was 3.81 minutes (and the maximum length was edited to be 5 minutes), so participants would have been able to view at least two videos fully if they wished to do so. We imposed a time restriction to ensure that participants had the opportunity to view videos as well as to provide a feeling of informational overload. A timer appeared in the top right-hand corner at all times so that participants could know how much time they had left. An example of the browsing screen is shown in Figure II-2 below (see Appendix C for more examples).

Figure II-2. Example Browsing Screen

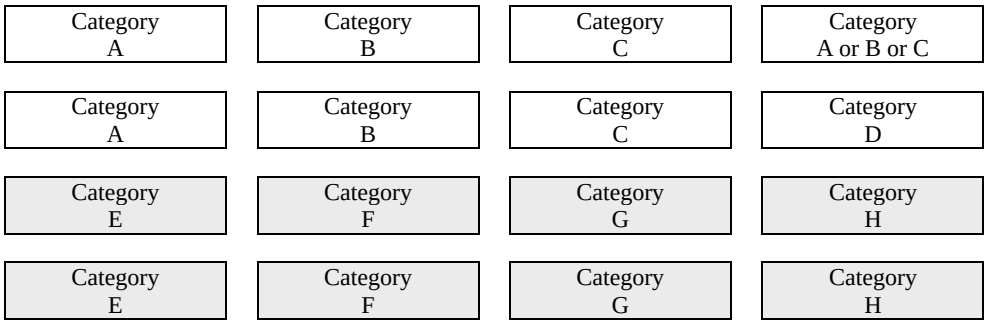


Note. Screenshot of a browsing screen from the smoking-high-views condition. Note that the smoking videos have high view counts and the non-smoking videos have low view counts.

Due to criticisms related to past selective exposure studies that there are imposed artificial search restrictions such as the number of selection options (the usual range being from six to 12 choices; Hastall & Knobloch-Westerwick, 2013; Knobloch-Westerwick, 2015a), this study attempted to increase ecological validity by mimicking the browsing page of YouTube as closely as possible (e.g., matching font style, the size of the images, etc.) and by presenting a number of videos that would most likely fit on

one screen when a user visits the website. For each video, the original (a) thumbnail image that was uploaded on YouTube, (b) title of the video, and (c) username of the video originator were presented. The browsing screen was programmed to visually look like a typical YouTube page and listed 16 videos – eight smoking videos and eight control videos. Two videos were selected from each subcategory (social acceptance smoking, tutorial smoking, testimonial smoking, social acceptance control, tutorial control, testimonial control, and risky behavior) with the exception of anti-smoking videos – only one anti-smoking video was displayed along with an extra pro-smoking video that was randomly selected across the three pro-smoking video subcategories. The breakout is summarized in Figure II-3. The distribution of videos was determined by a pilot study (N = 90) where we found that a one-to-one ratio of smoking to control videos was needed to get reasonable variance on selection of smoking materials. Getting enough variance on selection of smoking videos was essential, given that the purpose of this study was to gain some insight into their viewership.

Figure II-3. 16 Videos per Browsing Screen



Note. Category A = Social acceptance smoking; Category B = Tutorial smoking; Category C = Testimonial smoking; Category D = Anti-smoking; Category E = Social acceptance control; Category F = Tutorial control; Category G = Testimonial control; Category H = Risky behavior. White boxes represent smoking videos whereas gray boxes represent non-smoking control videos. Note that the order in which the videos were displayed on the browsing screen was randomized for each participant to minimize positional effects.

A computer program was embedded into the online survey so that exposure behavior was unobtrusively recorded. Exposure behavior was recorded as a *clickstream*, "a record of a user's activity on the Internet, including every website and every page of every website that the user visits" (Markellou, Panayiotaki, & Tsakalidis, 2009, p. 1086). Therefore, we could collect information on which videos participants viewed, as well as the order and duration for which each video was viewed.

After the browsing period of 10 minutes, participants received the post-test questionnaire that contained questions regarding retransmission intentions, smoking-related variables (attitudes, norms, and behaviors), and video evaluations (attitudes toward the video, emotional response, engagement, and empathy). Lastly, participants were debriefed.

Measures

Means, standard deviations, and Cronbach's α reliability coefficients for all multi-item variables are reported in Table II-5.

Table II-5. Means, Standard Deviations, and Cronbach's α Reliabilities for Scales

Measures	*M* (*SD*)	α
Personality traits		
Sensation seeking	3.29 (0.79)	.81
Regulatory focus: Promotion focus	3.98 (0.70)	.73
Regulatory focus: Prevention focus	3.77 (0.66)	.57
Belonging to a social group	4.01 (0.78)	.70
Social comparison orientation	3.54 (0.59)	.80
Need for cognition	3.45 (0.79)	.76
Need for affect	3.18 (0.83)	.62
Smoking-related outcome variables		
Social norms	1.93 (0.98)	.82
Attitudes	–2.08 (1.34)	.91

Smoking Interest

Smoking interest (adapted from Pierce et al., 1996) was measured by three items: (a) "Do you think you will try a cigarette soon?"; (b) "If one of your friends were to offer you a cigarette, would you smoke it?"; and (c) "Do you think you will be smoking cigarettes 1 year from now?" Those who answered "No," "Definitely not," and "Definitely not" respectively were given a 0 score because they reported complete disinterest; otherwise their responses were scored 1. Their scores were summed yielding an interest scale varying from 0 to 3 (0 score: n = 310; 1 score: n = 106; 2 score: n = 91; 3 score: n = 107). Higher scores indicate greater interest in smoking.

Personality Traits

Personality traits were included as covariates when testing hypotheses concerning what types of youth are more likely to select pro-smoking videos.

Sensation seeking. Sensation seeking was measured using Hoyle and colleague's (2002) Brief Sensation-Seeking Scale (BSSS; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002). Two items represented each aspect of sensation seeking: Experience seeking, boredom susceptibility, thrill and adventure seeking, and disinhibition. Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores indicating higher sensation seeking tendencies.

Regulatory focus. Regulatory focus was measured by averaging eight items taken from a composite regulatory focus scale by Haws, Dholakia, and Bearden (2010): Four items were on promotion focus (e.g., "I feel like I have made progress toward being successful in my life") and four items measured prevention focus (e.g., "I frequently think I can prevent failures in my life"). Response options ranged from 1 (*strongly*

disagree) to 5 (*strongly agree*). Promotion focus and prevention focus were assessed separately, as recommended by Haws and colleagues (2010).

Belonging to a social group. This measure was added to tap into peer pressure associated with smoking. Belonging to a social group was measured using a question adapted from David, Cappella, and Fishbein (2006) that asked "If your friends offered you a cigarette and you said no…" Response options were: "my friends would accept me and my decision," "my friends would respect me," "my friends would think I wasn't cool," and "I would feel left out." Response options ranged from -2 (*strongly disagree*) to 2 (*strongly agree*). Higher scores indicate that participants thought their friends would accept them even if they said no to a cigarette.

Social comparison orientation. Differences in the extent to which individuals compare themselves to others was measured by Gibbons and Buunk's (1999) 11-item social comparison orientation scale. An example item is as follows: "I often compare how I am doing socially (e.g., social skills, popularity) with other people." Response options range from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate higher social comparison orientations.

Need for cognition. Need for cognition was assessed using five items from Cacioppo and Petty's (1982) previously-validated need for cognition scale. Participants answered five items on a 5-point Likert-type scale ranging from 1 (*not at all like me*) to 5 (*a lot like me*), with higher scores indicating a higher need for cognition.

Need for affect. Need for affect was measured using four items from Maio and Esses's (2001) need for affect scale. Participants were asked to answer four items (two that loaded most highly on each factor of approach-avoidance) on a 7-point Likert-type

scale ranging from -3 (*strongly disagree*) to 3 (*strongly agree*), with higher scores indicating a higher need for affect.

The correlations among all individual characteristics variables are listed in Table II-6 below.

Table II-6. Correlations among Individual Characteristics

	1	2	3	4	5	6	7
1 Smoking interest	——						
2 Sensation seeking	.29***	——					
3 Promotion focus	–.10*	.26***	——				
4 Prevention focus	–.11**	.13**	.63***	——			
5 Belonging to social group	–.22***	–.10**	.30***	.15***	——		
6 Comparison orientation	.06	.18***	.35***	.40***	.10**	——	
7 Need for cognition	.04	.31***	.35***	.32***	–.01	.24***	——
8 Need for affect	–.09*	–.06	.19***	.11**	.14***	.04	.06

Selective Exposure Outcome Variables

The key outcome of interest for this study was selective exposure to pro-smoking videos. Exposure to videos was unobtrusively logged so we had behavioral data at the individual level on which videos were selected, how long each video was watched, in what order. Several measures of selective exposure served as dependent variables. Note that only selection of pro-smoking videos (and not of anti-smoking videos) was considered here.

Number of selected videos. A frequency measure of how many pro-smoking videos were selected (M = 0.71, SD = 1.33).

First selection likelihood. A dichotomous measure (0/1) of whether the first selection was a pro-smoking video (M = .17, SD = 0.38).

Exposure time. This is a measure of the aggregated length of pro-smoking videos watched in seconds (M = 67.92, SD = 125.09).

Smoking-Related Outcome Variables

Social norms. Perceived social norms were measured using an adapted version of Park and Smith's (2007) previously-validated scales that measure different types of norms. Responses were measured using three items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A single item from each type of personal norm was used: Subjective norm ("it is expected of me that I smoke"), personal descriptive norm ("most people whose opinion I value smoke"), and personal injunctive norm ("most people whose opinion I value would approve of my smoking"). Higher scores indicate more favorable normative perceptions about smoking.

Attitudes. Attitudes toward smoking were measured using five items on a 7-point semantic differential scale that stated "Smoking is…" followed by a set of bipolar adjective pairs: "bad/good," "unenjoyable/enjoyable," "unpleasant/pleasant," "foolish/wise," and "harmful/beneficial." Negative scores indicate negative attitudes and positive scores indicate positive attitudes toward smoking.

Analysis

Multiple logistic and ordinary least squares regression analyses were conducted to examine if smoking interest (H1-3) was associated with behavioral outcomes related to selection of pro-smoking videos: (1) number of selected videos, (2) first selection likelihood, and (3) exposure time. Smoking interest was treated as a categorical variable, ranging from 0 (no interest) to 3 (high interest). Condition, gender, age, race, and several personality traits were included as control variables. Participants from all three conditions are used in the analyses because there were no main or interaction effects from the

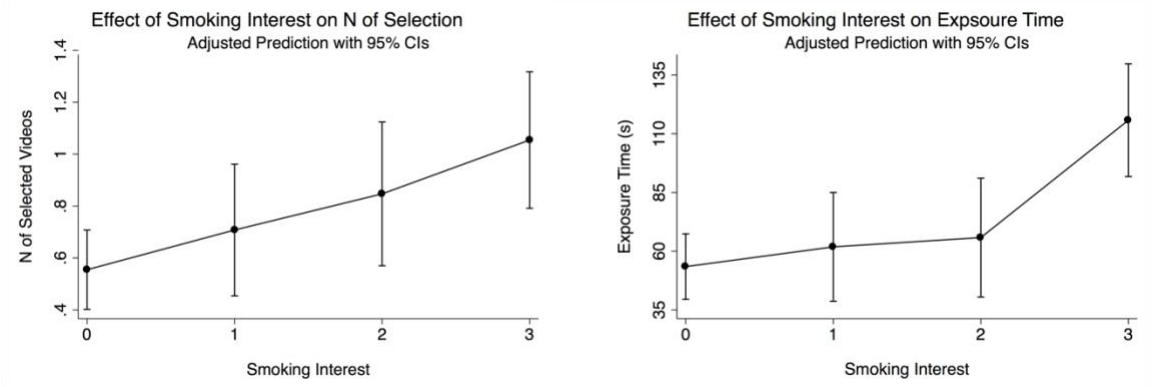
experimental condition on the association between individual predictors and selection outcomes.

To address research questions related to view count, multiple logistic and ordinary regression analyses were conducted to examine if there was an effect of condition on behavioral outcomes related to selection of pro-smoking videos. Then, smoking interest and its interaction with condition were entered into each model to see if there were any significant interactions. Lastly multiple ordinary least squares analyses were conducted to examine if condition was associated with social norms or attitudes about smoking. All tests were run on Stata 12.0 (StataCorp, 2011).

Results

Across the entire sample, individuals selected 3.93 videos (*SD* = 2.55) overall, of which 0.71 videos (*SD* = 1.33) were pro-smoking videos. On average, pro-smoking videos were viewed for a total of 1.13 minutes (*SD* = 2.08) out of the mandatory 10-minute browsing period.

Figure II-4. Smoking Interest Predicting Pro-Smoking Selective Exposure Outcomes



Note. Graphical depiction of smoking interest predicting pro-smoking selective exposure outcomes: (a) number of pro-smoking videos selected and (b) aggregated length of pro-smoking videos watched in seconds. Error bars represent 95% confidence intervals. Predicted values are adjusted with all control variables held at their mean score. Control variables include other personality traits (sensation seeking, promotion focus, prevention focus, belonging to a social group, social comparison orientation, need for cognition, need for affect), condition, gender, age, and race.

H1-3 were concerned with comparing people with varying interest in smoking and their selection behaviors of pro-smoking videos. Overall, the effect of smoking interest was significant on number of videos selected, $F(3, 594) = 3.47$, $p = .016$, and exposure time, $F(3, 594) = 6.23$, $p < .001$. The omnibus effect for first selection likelihood, however, was not significant, $\chi^2(3) = 3.68$, $p = .298$. Compared with participants with no interest in smoking (score = 0), participants who are extremely interested in smoking (score = 3) were significantly more likely to select pro-smoking videos more often and watch a greater amount of them. Thus, consistent with H1 and H3, pro-smoking videos were viewed more often and for longer periods of time by individuals with high interest in smoking than individuals with low interest in smoking. Data were not consistent with H2. Table II-7 and Figure II-4 depict the effect of smoking interest on selective exposure to pro-smoking videos.

Table II-7. Smoking Interest Predicting Pro-Smoking Selective Exposure Outcomes

	Selective exposure outcomes: Pro-smoking video selection		
	First selection likelihood	Number of selection	Exposure time
	OR [95% CI]	*B* (*SE*)	*B* (*SE*)
Smoking interest			
1 (Low interest)	0.93 [0.47, 1.82]	0.15 (0.15)	8.41 (13.85)
2 (Medium interest)	1.03 [0.51, 2.05]	0.29^{+} (0.16)	12.35 (14.98)
3 (High interest)	1.68^{+} [0.92, 3.08]	**0.50** (0.16)**	**62.33*** (14.66)**
Personality traits			
Sensation seeking	**1.47* [1.05, 2.06]**	0.14^{+} (0.08)	7.16 (7.06)
Promotion focus	0.92 [0.58, 1.45]	–0.09 (0.11)	1.18 (10.01)
Prevention focus	1.10 [0.70, 1.72]	0.02 (0.11)	–5.36 (10.03)
Belonging to group	1.19 [0.87, 1.62]	0.04 (0.08)	–4.03 (6.88)
Comparison orientation	0.72 [0.47, 1.10]	0.09 (0.10)	–2.02 (9.22)
Need for cognition	1.08 [0.78, 1.49]	–0.01 (0.08)	0.59 (6.91)
Need for affect	0.83 [0.62, 1.11]	0.01 (0.07)	**–13.74* (6.10)**
Condition			
2 (Smoking-high-views)	1.47 [0.84, 2.58]	0.20 (0.13)	16.05 (12.20)
3 (Smoking-low-views)	1.05 [0.59, 1.89]	–0.07 (0.13)	–5.10 (12.25)
Demographics			
Female	**0.39*** [0.25, 0.62]**	**–0.33** (0.11)**	**–43.20*** (10.16)**
Age	**1.16* [1.02, 1.30]**	0.00 (0.03)	4.17 (2.65)
Non-White	1.54^{+} [0.98, 2.43]	0.04 (0.11)	16.05 (9.90)
R^2	.09	.06	.11

Note. $^{+}$ p < .10; * p < .05; ** p < .01; *** p < .001. Odds ratios and unstandardized coefficients are shown; 95% confidence intervals and standard errors are in parentheses. McFadden's R^2 and R^2 reported. Exposure time is in seconds. Reference categories – smoking interest: 0 (*no interest*); condition: 1 *(no-view-count-comparison condition*); gender: male; race: White. No interactions between smoking interest and condition were significant. N = 614.

The first research question asked whether there was a main effect of condition (i.e., view count manipulation; IV) on selection of pro-smoking videos (DV). Regression analyses showed that condition did not predict any of the selective exposure outcomes

(see Table II-8). For the second research question, interaction terms between condition and smoking interest were added into each of the models presented in Table II-8. However, none of the interactions were statistically significant, suggesting no differential effect of view count on selection behaviors based on smoking interest.

Table II-8. Condition Predicting Pro-Smoking Exposure Outcomes

	Selective exposure outcomes: Pro-smoking video selection		
	First selection likelihood	Number of selection	Exposure time
	OR [95% CI]	*B* (*SE*)	*B* (*SE*)
Condition			
2 (Smoking-high-views)	1.35 [0.79, 2.30]	0.20 (0.13)	16.09 (12.66)
3 (Smoking-low-views)	1.04 [0.60, 1.82]	–0.06 (0.13)	–3.68 (12.73)
R^2	.00	.01	.01

Note. $^{+}$ p < .10; * p < .05; ** p < .01; *** p < .001. Odds ratios and unstandardized coefficients are shown; 95% confidence intervals and standard errors are in parentheses. McFadden's R^2 and R^2 reported. Reference category – condition: 1 (*no-view-count-comparison condition*). No interactions between Smoking interest and Condition were significant. N = 614.

The final two research questions concerned whether view count was associated with subsequent social norms or attitudes about smoking. There was no significant effect of manipulated view count on social norms about smoking, $F(2, 611) = 1.53$, $p = .217$, although there was a trend in the expected direction with participants in the smoking-high-views condition having the most favorable social norms toward smoking ($M = 2.02$, $SD = 1.04$), followed by the smoking-low-views condition ($M = 1.89$, $SD = .97$), and no-view-count-comparison condition ($M = 1.86$, $SD = .90$). The effect of manipulated view count was significant on attitudes toward smoking, $F(2, 611) = 3.35$, $p = .036$. Participants who were in the no-view-count-comparison condition ($B = -0.32$, $SE = 0.14$, $p = .018$) and smoking-low-views condition ($B = -0.26$, $SE = 0.13$, $p = .043$) had less

favorable attitudes toward smoking compared with those who were in the smoking-high-views condition.

Discussion

It is well-established that pro-smoking videos on YouTube often include misleading claims and some have accumulated views in the tens of thousands. For example, the pro-smoking video in our sample with the highest number of views has over 10 million views. Little is known, however, about who is watching these videos. Without this key piece of information, it is not possible to know whether the presence of such misleading videos in the online environment is causing any harm. Hence, the ultimate question of interest concerned whether youth who are high at risk for smoking are more likely to watch pro-smoking videos.

The results of this study indicate that youth with high levels of interest in smoking were more likely to select a greater number of pro-smoking videos and to spend more time watching them than those with lower levels of interest. Moreover, looking at behavioral outcomes that tend to be related to sustained viewing as opposed to mere selecting (i.e., exposure time as opposed to number of selected videos or first selection likelihood), youth interested in smoking were more likely to spend more time watching pro-smoking videos compared with those who had no interest.

The fact that smoking interest affected selection of pro-smoking videos is an important finding given its relationship with smoking uptake and smoking behavior. Recall that the meta-analysis by Hart and colleagues (2009) found that congenial information that supported individual predispositions was more likely to be selected over uncongenial information. In line with these results, pro-smoking videos contained

information that was congenial for individuals who have greater intentions to smoke. The information present in these videos was in line with these individuals' existing beliefs, attitudes, and behaviors related to smoking. Pro-smoking videos also have an advantage in terms of informational utility for youth interested in smoking, which, according to Hart et al. (2009) would further increase the preference for congenial information. This evidence supports at least one side of the two-sided selective exposure hypothesis that people have a natural tendency to seek out attitude congruent information.

In terms of the effect of social endorsements on youths' selective exposure to pro-smoking materials, results showed that selection behavior of pro-smoking videos did not significantly differ when smoking videos had no view counts (Condition 1), high view counts (Condition 2), or low view counts (Condition 3). These patterns did not differ based on interest in smoking. Note that the contrast between view counts was intentionally strong (low view counts: 8,650 to 34,747; high view counts: 575,877 to 47,274,402). Moreover, view count was randomly assigned to each video such that no video was tied to a specific view count.

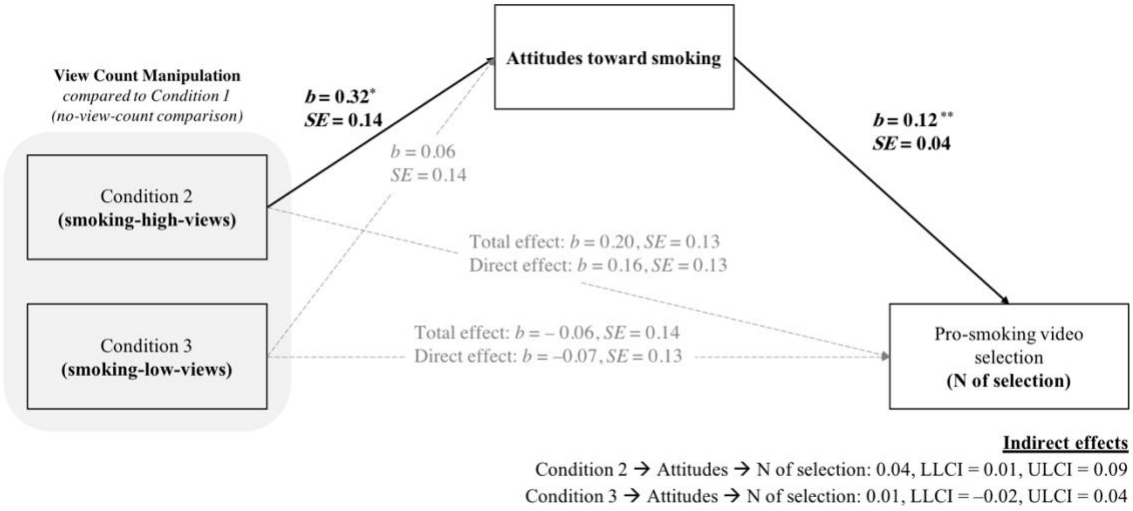
These results were somewhat unexpected, given the growing literature on social influence that suggest there should be a stronger effect of social endorsements on selection (H. S. Kim, 2015; Knobloch-Westerwick, Sharma, et al., 2005; Messing & Westwood, 2012; Sundar & Nass, 2001; Winter et al., 2016). One possible explanation is that since our study used artificial manipulations of view count, the numbers presented could have been unconvincing to participants. Some studies (e.g., Fu, 2012; Salganik et al., 2006) used numbers that reflected the "real" intrinsic popularity of the content. Another possibility is that our manipulation was not strong enough. For instance,

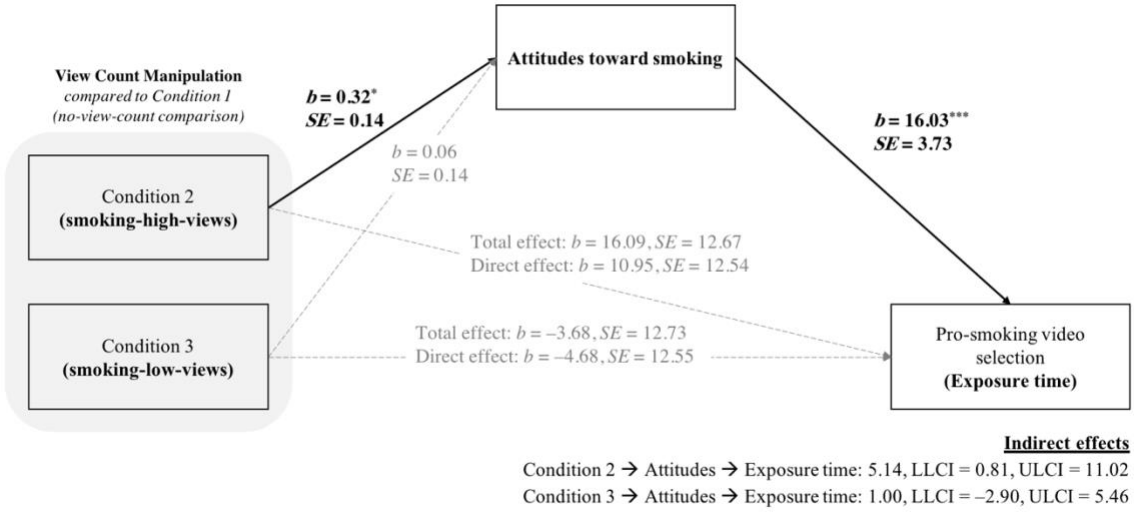
Salganik and colleagues (2006) found that the effects of social endorsements were stronger when the manipulation was made more noticeable (i.e., in descending order or popularity). Nevertheless, while our social endorsement manipulation may not have been prominent, it was ecologically valid – view count information was presented as closely as possible to YouTube. Furthermore, while other studies examined content that were generally more spread out in terms of topic, with older populations, our study examined selection of risky material by youth. User-generated videos also tend to be noisier than news articles or songs in terms of information presented alongside view count (thumbnail images, video titles, usernames). In fact, a study on user-generated videos found that the bandwagon effect of view count diminished in the presence of a thumbnail image and likewise in the presence of more textual information when there was no thumbnail image (Fu, 2012). Future research should examine whether the effect of social influence on selection depends on what type of content is in question as well as on how the prominence with which social endorsements are presented.

Although view count information did not affect youth's selective exposure to pro-smoking videos nor social norms about smoking, it did affect attitudes toward smoking. Participants who were randomly assigned to the smoking-high-views condition had significantly more positive attitudes toward smoking than participants in the smoking-low-views or no-view-count-comparison conditions. Therefore, it appears that social endorsements do not go unnoticed – even though selection behaviors were unaffected by view count, view count influenced subsequent attitudes. It is troubling that youth hold more favorable attitudes toward smoking when given the impression that pro-smoking

videos are popular, as previous research (e.g., Ajzen, 1991) shows that attitudes are indicative of future behavior to some degree.

Figure II-5. The Indirect Effects of Condition on Selection through Attitudes





Note. Unstandardized regression coefficients and bootstrapping-based confidence intervals are reported (sample size = 5,000). LLCI = lower limit 95% confidence interval; ULCI = upper limit 95% confidence interval. Reference category – condition: 1 (*no-view-count comparison condition*). *N* = 614.

Going a step further, despite there being no direct effect of the view count manipulation on pro-smoking video selection outcomes, post hoc analyses revealed that there was an indirect effect of view count on pro-smoking video selection through

attitudes toward smoking. Using Hayes' (2009) approach and confidence intervals with bootstrapping using Preacher and Hayes' (2008) PROCESS macro, we found a significant positive indirect effect of condition on selection of pro-smoking videos through attitudes, only for the smoking-high-views condition versus the no-view-count-comparison condition. As can be seen in Figure II-5, when smoking videos had high views, this led to more positive attitudes toward smoking which subsequently led to greater selection and prolonged viewing of pro-smoking videos, compared with when smoking videos had no view counts. Hence, it appears that when youth are given the impression that smoking videos are popular, their selection patterns are indirectly affected through more positive attitudes toward smoking. This finding, while not a direct effect, nevertheless furthers our concerns regarding pro-smoking videos because high view counts, positive attitudes toward smoking, and viewing of pro-smoking videos can mutually reinforce one another, strengthening smoking-related attitudes or behaviors over time, in line with Slater's (2007) reinforcing spirals model.

This study adds to the selective exposure literature by studying a new domain of user-generated videos. Even though some scholars have begun to explore selective exposure patterns with online clips (see Knobloch-Westerwick & Lavis, 2017), this still remains a relatively new area of study. While the variety of videos available makes it difficult to conduct a controlled study, it is important to understand how selection occurs with videos because it is becoming more commonplace to access and view videos online. As Knobloch-Westerwick (2015a) has noted, "with the enormous variation in quality of the posted videos, the question of how users pick from the cornucopia of clips is intriguing" (p. 349). Furthermore, there has been continuing debate surrounding whether

newer media platforms and the increase in information accessibility has resulted in greater exposure to information that reinforces existing individual predispositions. Extrapolating from the findings of this study, it may be that newer media platforms are not necessarily expanding reach, but rather, encouraging more attitude-confirming exposure patterns.

There are some limitations to this study to note when interpreting the findings. Each person was exposed to a predetermined 1:1 ratio of eight smoking and eight non-smoking videos. In a more realistic setting, one is unlikely to be faced with such a high proportion of smoking video options so the findings of this study may be stronger than and not necessarily generalizable to selection patterns in the real world. Nonetheless, the algorithm of YouTube is designed to offer people more of what they previously selected so such an environment is not that improbable for people who initially select smoking videos. Another limitation concerns the selection of stimulus materials. Specifically, the pro-smoking videos were selected based on researcher consensus on how misleading the videos were rather than taking a more systematic approach. Although this could be seen as arbitrary, note that we relied on expert judgment in an attempt to use pro-smoking videos that were more potentially problematic and thus have a greater need for regulation. Future studies could benefit from taking a more rigorous approach and conduct a study only using pro-smoking videos that contain explicit smoking-related misinformation or examine categories of misleading vs. inaccurate videos. Lastly, because smoking interest cannot be experimentally manipulated, there may have been some other unmeasured variable that went overlooked and can explain the results that we found. The magnitude of the effect that youth with higher interest in smoking are more likely to select and view

pro-smoking videos is not overwhelmingly large. However, it is noteworthy that this effect is still present in spite of factors like impression management motives that might limit the size of the effect than would be the case in the real world. Moreover, this was a rather conservative test in that the non-smoking control videos used in the study actually had greater original view counts compared with smoking videos (i.e., we tested selection of pro-smoking videos in the presence of other interesting videos).

Notwithstanding these limitations, there are several methodological strengths of this study. Instead of relying on self-reports or forced exposure, we developed a more ecologically valid browsing setting (using real-world messages) and tracked selective exposure through unobtrusive means that could record selection behavior as it unfolds. This selective exposure paradigm allows us to better tap into the motivations driving selective exposure by making use of behavioral data and can overcome the shortcomings of self-report such as recall bias, social desirability bias, and the lack of introspective ability (Knobloch-Westerwick, 2015b).

This chapter of the dissertation addressed a practical and important question of whether youth who are high at risk for smoking are more susceptible to watch pro-smoking videos on YouTube. The availability of pro-smoking videos in the information sphere itself is problematic, but now that we have shown – with behavioral data – that youth who are particularly interested in smoking are more likely to watch these videos, the problem is twofold. This chapter provided a first step into assessing audience characteristics that drive selection of videos containing potentially misleading smoking information. As a natural extension, subsequent chapters study whether these videos exert any negative effects on smoking-related outcomes.

CHAPTER III |

STUDY 2 - IS SELECTION OF PRO-SMOKING VIDEOS ASSOCIATED WITH SMOKING-RELATED OUTCOMES? AN EXPLORATORY STUDY

Chapter 2 illustrated that youth with greater interest in smoking were more likely to select and view pro-smoking videos compared with those with lesser interest in smoking. Due to the at-risk nature of individuals who choose to view these videos, a natural question that follows is: Are pro-smoking videos on YouTube persuasive? This question is nontrivial because greater exposure to pro-smoking videos may not necessarily result in behavioral consequences (i.e., uptake of smoking) if the videos are not particularly effective.

Exposure to Pro-Smoking Content

Past research has established that exposure to smoking on entertainment media and positive media portrayals of smoking can be associated with smoking initiation among adolescents (e.g., Charlesworth & Glantz, 2005; Sargent et al., 2009). Using a nationally representative sample of U.S. adolescents (ages 10-14), Sargent and colleagues (2005) found that exposure to movie smoking directly predicted smoking initiation. Extending this, a meta-analysis of 51 studies on adolescents' tobacco use found that high exposure to tobacco advertising as well as pro-tobacco depictions in traditional media such as movies, television, and tobacco advertising not only positively influenced adolescents' attitudes toward smoking, it more than doubled their odds of smoking uptake (Wellman, Sugarman, DiFranza, & Winickoff, 2006).

Similarly, cross-sectional surveys on newer types of media found that self-reported exposure to pro-smoking information through social media affected young adults' attitudes, social norms, intentions, and behaviors associated with smoking (Depue, Southwell, Betzner, & Walsh, 2015; W. Yoo, Yang, & Cho, 2016). Although YouTube was included as part of the exposure measure, these studies did not focus primarily on YouTube videos.

Taking these findings together, while it seems intuitive that pro-smoking YouTube videos will also have negative effects on youth, the actual effectiveness of positive portrayals of smoking in videos posted by individuals whose credibility is unknown may be quite different compared with that of movies, televisions, or posts by members of one's social network. To elaborate, depictions of smoking in traditional media are often accompanied by attractive media characters or celebrities with whom viewers identify with or form parasocial (imaginary) relationships with. Exposure to pro-smoking information through social media also presents a similar risk in that often times this information is posted, shared, or liked by their "friends" with whom they have actual (real) relationships with. Therefore, while there is circumstantial evidence that exposure to pro-smoking videos on YouTube will have similar detrimental effects, the aforementioned findings cannot be directly translated into the context of YouTube, especially when the YouTuber in question is not well known such that their credibility is suspect.

Research on smoking videos on YouTube have largely been limited to content analyses (e.g., Cranwell et al., 2015; Forsyth & Malone, 2010; Freeman & Chapman, 2007; K. Kim et al., 2010; Paek, Kim, & Hove, 2010) and studies of online reactions to

antismoking videos (e.g., Chung, 2015; Shi, Messaris, & Cappella, 2014). While many raise concerns about the widespread availability of positive portrayals of smoking on YouTube, there is little evidence that pro-smoking videos are associated with negative smoking-related outcomes.

Therefore, an exploratory analysis of post-exposure data collected as part of Study 1 was conducted to gain some insight into whether exposure to pro-smoking videos is associated with any negative smoking-related outcomes. While this analysis would only provide correlational evidence, this step was carried out in order to assess if there was any reason to believe that these set of pro-smoking videos were causing harm. Also, it was of interest to examine if youths' evaluations of pro-smoking videos were different, based on interest in smoking. Specifically, the following research questions are raised:

RQ1-2: Is selection of pro-smoking videos associated with more positive (1) social norms and (2) attitudes about smoking?

RQ3-4: Did youth with high interest in smoking have (3) more positive reactions to and (4) greater engagement with pro-smoking videos than youth with low interest in smoking?

Method

Subjects

A national sample of 614 U.S. adolescents and young adults between the ages of 15 and 21 years was recruited through an online research panel, Toluna, using smoking interest (Pierce et al., 1996) as a quota to sample a 1:1 ratio of participants with interest in smoking and no interest in smoking. Overall, 59.9% of the sample were female and 45.2% were non-White. (See *Subjects* in Chapter 2 for more details.)

Stimulus Material

A total of 64 videos were used as experimental stimuli: 32 smoking videos and 32 non-smoking control videos (see Appendix A for a full list of videos and see *Stimulus Material* in Chapter 2 for further details). For each participant, eight smoking (of the 32) videos and eight non-smoking (of the 32) videos were randomly sampled. None of the videos were age-restricted or restricted to certain viewers at the time they were collected so that all videos were available to anyone who visited YouTube.

Design

During a time-restricted browsing phase, each participant was shown a YouTube-like browsing page with 16 randomly selected videos (eight smoking and eight non-smoking) and was able to freely view video(s) of their choice. View count was manipulated in this study such that in Condition 1 (*no-view-count-comparison condition*), there was no view count information, in Condition 2 (*smoking-high-views condition*), all smoking videos had high view counts and all non-smoking videos had low view counts, and in Condition 3 (*smoking-low-views condition*), smoking videos had low view counts and non-smoking videos had high view counts. For more details on the procedures of the study, refer to the *Design* section of Chapter 2.

After the browsing phase of 10 minutes, participants received questions on attitudes and norms about smoking. Next, participants were asked to evaluate two videos. The two videos were the "top 2" videos that they viewed in terms of the ratio of how much each selected video was viewed out of the total length of the specific video.[2] For instance, if a participant viewed three videos for exactly two minutes each and the total

[2] Note that if there was a "tie," videos that were selected earlier were prioritized.

length of the videos were two minutes, three minutes, and five minutes, respectively, the first two videos would be the "top 2" videos because he or she viewed 100% and 66.7% of the first two videos as opposed to 40% of the last video. Participants evaluated two videos by answering questions regarding their attitudes, emotional response, engagement, and empathy towards the video or person(s) in the video.

Measures

Pro-Smoking Video Selection

The key predictors for this study were selective exposure to pro-smoking videos. Exposure to videos was unobtrusively logged so we had behavioral data at the individual level on which videos were selected, how long each video was watched, in what order. Several measures of selective exposure served as independent variables.

Number of selected videos. A frequency measure of how many pro-smoking videos were selected ($M = 0.71$, $SD = 1.33$).

First selection likelihood. A dichotomous measure (0/1) of whether the first selection was a pro-smoking video ($M = .17$, $SD = 0.38$).

Exposure time. This is a measure of the aggregated length of pro-smoking videos watched in seconds ($M = 67.92$, $SD = 125.09$).

Smoking Interest

Smoking interest (adapted from Pierce et al., 1996) was measured by three items: (a) "Do you think you will try a cigarette soon?"; (b) "If one of your friends were to offer you a cigarette, would you smoke it?"; and (c) "Do you think you will be smoking cigarettes 1 year from now?" Those who answered "No," "Definitely not," and "Definitely not" respectively were those who had complete disinterest in smoking ($n =$

310); otherwise their responses indicated interest in smoking (n = 304). This measure was used dichotomously to distinguish between participants with greater and lesser interest in smoking.

Smoking-Related Outcome Variables

Social norms. Social norms were measured using an adapted version of Park and Smith's (2007) previously-validated scales that measure different types of norms. Responses were measured using three items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A single item from each type of personal norm was used: Subjective norm ("it is expected of me that I smoke"), personal descriptive norm ("most people whose opinion I value smoke"), and personal injunctive norm ("most people whose opinion I value would approve of my smoking"). Higher scores indicate more favorable normative perceptions about smoking (Cronbach's α = .82, M = 1.93, SD =.98).

Attitudes. Attitudes toward smoking were measured using five items on a 7-point semantic differential scale that consists of a set of bipolar adjective pairs such as "bad/good," "unenjoyable/enjoyable," "unpleasant/pleasant," "foolish/wise," and "harmful/beneficial." Negative scores indicate negative attitudes and positive scores indicate positive attitudes toward smoking cigarettes (Cronbach's α = .91, M = -2.08, SD = 1.34).

Video Evaluations

Positive reactions toward video. This is a combined measure of attitudes toward the video and positive emotional reactions toward the video. *Attitudes toward the video* was measured using Nan's (2013) scale of advertising persuasiveness. Participants were

asked their overall attitudes toward the videos they saw. Response options included "negative/positive," "unfavorable/favorable," and "dislike/like." *Positive emotional reactions* were measured by asking participants how much of each of the following words described how they felt while viewing the video. Participants were asked to indicate their how hopeful, proud, enthusiastic, eager, and motivated they felt after viewing each video. Attitudes toward the video were transformed so that the maximum score is 5, before combining with emotional responses. Higher scores indicate a more positive reaction towards the video (Cronbach's $\alpha = .93$, $M = 3.32$, $SD = 1.07$).

Engagement with video. Overall engagement with the video was measured using nine items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale combines items from *transportation* (e.g., "my attention was fully captured"), *perceived similarity* (e.g., "the person in the video is similar to me in the way he or she thinks"), and *empathy* (e.g., "I felt the person/people in the video was/were interesting"). Higher scores indicate more engagement with the video (Cronbach's $\alpha = .89$, $M = 3.03$, $SD = .89$). The scale was adapted from Kim and colleagues (2012), who provided evidence for the scale's validity and reliability (H. S. Kim, Bigman, Leader, Lerman, & Cappella, 2012).

Analysis

First, multiple ordinary least squares regression analyses were conducted to examine if selection of pro-smoking videos (first selection, selection frequency, and exposure time) was associated with social norms (RQ1) or attitudes (RQ2) about smoking. Smoking interest, condition, and demographic variables (gender, age, race) were included as control variables.

Second, among evaluations of pro-smoking videos, independent-samples t-tests were conducted to compare positive reactions (RQ3) and engagement (RQ4) using a dichotomous measure of smoking interest – essentially, the comparison was between youth interested in smoking and youth with no interest in smoking. All tests were run on Stata 12.0 (StataCorp, 2011).

Results

RQ1 was concerned with the association between pro-smoking video selection and social norms associated with smoking. Generally speaking, looking at the results of the bivariate regressions, those who viewed pro-smoking more often, earlier, and longer were more likely to have greater normative beliefs about smoking. Controlling for other variables, only first selection likelihood remained significant among variables associated with pro-smoking video selection. In other words, individuals who selected a pro-smoking video as their first choice tended to think that smoking was more normative. See Table III-1 for details.

Table III-1. Pro-Smoking Video Selection Predicting Social Norms

	Social norms favoring smoking					
	Bivariate OLS regressions					Multiple OLS regression
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Pro-smoking video selection						
First selection likelihood	**.47*** (.10)**					**.25* (.12)**
Selection frequency		**.06* (.03)**				
Exposure time			**.001*** (.00)**			.00 (.00)
Smoking interest				**.62*** (.07)**		**.56*** (.07)**
Condition						
2 (Smoking-high-views)					.16 (.10)	.12 (.09)
3 (Smoking-low-views)					.04 (.10)	.04 (.09)
Demographics						
Female						**–.33*** (.08)**
Age						**.05** (.02)**
Non-White						.02 (.07)
R^2	.03	.01	.03	.10	.01	.17

Note. $^{+}$ p < .10; * p < .05; ** p < .01; *** p < .001. Unstandardized coefficients are shown with standard errors in parentheses. Reference categories – smoking interest: 0 (*no interest*); condition: 1 (*no-view-count-comparison condition*); first selection likelihood: 0 (*not selected in first selection*); gender: male; race: White. Selection frequency was dropped from Model 6 due to multicollinearity. N = 614.

RQ2 was concerned with the association between pro-smoking video selection and attitudes toward smoking. Again, bivariate regressions show that those who viewed pro-smoking more often, earlier, and longer were more likely to have more positive attitudes toward smoking. In the multiple regression, when other control variables were added to the model, only exposure time was significant among variables related to pro-

smoking video selection. Specifically, individuals who had prolonged exposure to pro-smoking videos had more positive attitudes toward smoking, above and beyond smoking interest and view count information. These results are summarized in Table III-2 below.

Table III-2. Pro-Smoking Video Selection Predicting Attitudes

	Attitudes favoring smoking					
	Bivariate OLS regressions					Multiple OLS regression
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Pro-smoking video selection						
First selection likelihood	**.35*** **(.14)**					–.08 (.16)
Selection frequency		**.13**** **(.04)**				
Exposure time			**.002***** **(.00)**			**.00*** **(.00)**
Smoking interest				**1.07***** **(.10)**		**.96***** **(.10)**
Condition						
2 (Smoking-high-views)					**.32*** **(.14)**	**.28*** **(.12)**
3 (Smoking-low-views)					.06 (.14)	.10 (.12)
Demographics						
Female						**–.40***** **(.10)**
Age						**.11***** **(.03)**
Non-White						–.09 (.10)
R^2	.01	.02	.03	.16	.01	.23

Note. $^{+}$ p < .10; * p < .05; ** p < .01; *** p < .001. Unstandardized coefficients are shown with standard errors in parentheses. Reference categories – smoking interest: 0 (*no interest*); condition: 1 (*no-view-count-comparison condition*); first selection likelihood: 0 (*not selected in first selection*); gender: male; race: White. Selection frequency was dropped from Model 6 due to multicollinearity. N = 614.

Focusing on the analysis of video evaluations, there was a significant difference in positive reactions toward pro-smoking videos between youth with low interest in

smoking (M = 1.84, SD = 0.92) and youth with high interest in smoking (M = 2.33, SD = 1.09); $t(162) = -2.88$, $p < 01$. In addition, there was a significant effect of smoking interest on engagement, $t(162) = -2.87$, $p < .01$, with youth with high interest in smoking (M = 2.68, SD = 1.00) having greater engagement with pro-smoking videos compared with youth with low interest in smoking (M = 2.25, SD = 0.76). Therefore, with regard to RQ3-4, youth with high interest in smoking had more positive reactions to and greater engagement with pro-smoking videos, compared with youth with low interest in smoking.

Discussion

This chapter analyzed post-exposure data collected in Study 1 to examine whether selection of pro-smoking videos was associated with negative effects, especially for youth with high interest in smoking. Given that Study 1 found that high-risk youth were more likely to select pro-smoking videos, it was of interest to see if such selection patterns could potentially have detrimental effects.

Results showed that selection of pro-smoking videos was indeed associated with more positive social norms and attitudes about smoking. Specifically, individuals who selected a pro-smoking video as their first choice also tended to think that smoking was more normative. Moreover, individuals who had longer exposure times to pro-smoking videos had more positive attitudes toward smoking. These associations were significant, above and beyond smoking interest and view count. As attitudes and norms are indicative of behavior (e.g., Fishbein & Ajzen, 2010), these findings suggest that pro-smoking videos have the potential to affect behaviors associated with smoking.

In addition, analyzing the reactions to pro-smoking videos, youth with high interest in smoking evaluated pro-smoking videos more positively and thought they were more engaging compared with youth with low interest in smoking. Empirical studies have consistently shown that attitudes, emotional response, and engagement with videos are considered to be mediators of persuasion (e.g., H. S. Kim et al., 2012; Nan, 2013). In addition, the aforementioned meta-analysis by Wellman and colleagues (2006) found that exposure to pro-tobacco content that was more engaging nearly triples the odds of tobacco use. Put together, the result that youth with high interest in smoking had more positive reactions to pro-smoking videos and found them to be more engaging could mean that they would be more susceptible to be persuaded by these materials.

Furthermore, post hoc analyses were conducted to see if the association between pro-smoking selection (first selection likelihood, number of selection, exposure time) and smoking-related outcomes (social norms, attitudes) was mediated by video reactions (engagement, positive reactions). Because these analyses were limited to individuals who evaluated pro-smoking videos (i.e., had either one or two pro-smoking videos as their top video; $N = 141$), there was limited power. As such, there was no evidence for mediation when the number of selection or first selection likelihood was entered into the model as the independent variable. Nevertheless, positive reactions to pro-smoking videos were found to mediate the relationship between exposure time and norms related to smoking. That is, prolonged exposure to pro-smoking videos led to more positive video reactions, which in turn, resulted in more favorable social norms. Video reactions completely mediated the relationship between exposure time and norms (total effect: $B = 0.0013$, $SE = 0.0007$, $p < .05$; direct effect: $B = 0.0007$, $SE = 0.0006$, $p = .263$). A bias-corrected

confidence interval for the mediation based on 5,000 bootstrap samples was above zero, confirming these results. In addition, there was a positive indirect effect of exposure time on smoking-related attitudes through positive video reactions. Details of the analyses are reported in Appendix D. While these mediational results do not help with causality, they point to the importance of video evaluations and their influence on smoking-related outcomes. For instance, the association between pro-smoking exposure time and social norms was found to be solely driven by positive reactions to pro-smoking videos. Therefore, not just exposure to pro-smoking videos, but how these videos are received by at-risk youth seems to be of significance.

There are some limitations that need to be considered when interpreting these set of results. The biggest shortcoming is that because exposure to pro-smoking videos was not experimentally manipulated and there was no pre-test measure of attitudes and norms, it is difficult to eliminate reverse causality. In other words, it is equally likely that individuals who had more positive attitudes and normative beliefs about smoking were more likely to select pro-smoking videos. Nonetheless, the fact that the effects still remain when controlling for smoking interest – which is a smoking intention-like measure – may offer partial support for directionality. Another limitation is that evaluations of pro-smoking videos were only provided by participants who had at least one pro-smoking video as one of their top videos. The message evaluations may not have been stable because the number of evaluations per video was limited. Furthermore, the evaluation scores themselves were not that high for youth with low interest in smoking (engagement: $M = 2.25$, $SD = 0.76$; positive reactions: $M = 1.84$, $SD = 0.92$) as well as youth with high interest in smoking (engagement: $M = 2.68$, $SD = 1.00$; positive

reactions: $M = 2.33$, $SD = 1.09$). Nonetheless, it should be noted that even with limited power and relatively low score levels, there were still significant differences in the evaluations between these two groups.

Based on the results of these exploratory analyses, there is some reason to believe that pro-smoking videos are harmful, especially for at-risk youth. Since this is the population that is more predisposed to select and view pro-smoking videos, if these videos are indeed efficacious, the presence of pro-smoking videos in the online environment becomes a more serious issue. Nevertheless, the results presented in this chapter are merely correlational. Therefore, the following chapter presents the results of an experimental test to see if exposure to pro-smoking videos has any direct negative effects.

CHAPTER IV |

STUDY 3 - DOES EXPOSURE TO PRO-SMOKING VIDEOS HAVE NEGATIVE EFFECTS? AN EXPERIMENTAL STUDY

Chapter 3 found correlational evidence that selection of pro-smoking videos was associated with smoking-related outcomes. To confirm the directionality of this association, here I conduct an experiment to see if exposure to pro-videos has any immediate negative effects. While exposure to pro-smoking imagery via traditional and new media have both been tied to smoking initiation among adolescents (see Charlesworth & Glantz, 2005; Depue et al., 2015; Sargent et al., 2005; Sargent et al., 2009; Wellman et al., 2006; W. Yoo et al., 2016 for examples), there has been no experimental test of whether exposure to positive portrayals of cigarette smoking in user-generated videos has any deleterious consequences.

While at first glance it is intuitive to think that pro-smoking exposure on YouTube will be equally (or possibly more) harmful to at-risk youth, there are some aspects of user-generated content that one should consider.

Credibility of Online Health Information

In spite of the fact that YouTube is one of the most popular online destinations for youth (Alexa, 2016; YouTube, 2016), due to the nature of YouTube, a platform where virtually anyone can upload content, it is a source that may not necessarily be deemed as being credible or reliable. Many YouTube videos give advice or touch upon topics that have potential to affect individual perceptions regarding health. Because user-generated videos are often posted by individuals who are not experts, intentional or not, many

contain information that is inaccurate, misleading, or even dangerous (see Biggs, Bird, Harries, & Salib, 2013). Research on YouTube has raised concerns regarding the prevalence and popularity of misleading videos that have potential to negatively affect health. Examples include videos that promote anorexia and unrealistic ideals of thinness (Syed-Abdul et al., 2013), videos that discourage use of vaccinations (Briones et al., 2012; Keelan et al., 2007), and of course, videos that contain positive portrayals of smoking (Forsyth & Malone, 2010; Freeman & Chapman, 2007; K. Kim et al., 2010).

Undoubtedly, concerns regarding the potential harm of the Internet when it comes to health information are not new; the literature argues that even information on "apparently credible" health websites are inconsistent, and their accuracy, debatable (Berland et al., 2001; Kunst, Groot, Latthe, Latthe, & Khan, 2002, p. 582). With user-generated content, issues surrounding inaccuracy and inconsistency of health information can only be more pronounced. Empirical findings show that compared with YouTube videos posted by professional societies or news organizations, videos by "peers" containing personal experiences – and therefore have more room for misleading information – induced more engagement in the form of "likes," "dislikes," and comments (Pant et al., 2012).

But there is a gap in the literature because research has not yet examined the credibility and/or effectiveness of videos containing misleading health-related information. The availability of harmful information alone is not enough. The important question is whether exposure to such content brings about behavioral consequences.

According to Bandura's (1977) social learning theory, "most of the behaviors that people display are learned, either deliberately or inadvertently, through the influence of

example" (Bandura, 1977, p. 5). Since YouTube videos contain people "like them" modeling certain behaviors that youth may perceive to be "cool," they may be particularly impactful for young viewers. In fact, a lot of pro-smoking videos on YouTube emphasize social aspects and rewards related to smoking (Carroll, Shensa, & Primack, 2013).

On the other hand, because information on YouTube is largely unregulated and unverified, viewers may not perceive YouTube videos to be credible sources of information. There are three dimensions to perceived credibility that may affect how pro-smoking video content on YouTube is received by audience members: (a) source credibility, (b) message credibility, and (c) media credibility (Metzger, Flanagin, Eyal, Lemus, & McCann, 2003).

Source credibility, defined as "judgments made by a perceiver concerning the believability of a communicator," centers around individual judgments of the source's expertise and trustworthiness (O'Keefe, 1990, p.181). In the context of YouTube, homophily or liking of the source seems to be more important than perceived source expertise: Empirical findings illustrate that YouTube videos that contain peers were thought of being more credible and therefore more persuasive than videos by professional organizations (e.g., Hansen, Lee, & Lee, 2014; Lee & Watkins, 2016; Paek, Hove, Jeong, & Kim, 2011). Users also seem to have expectations of homophily when searching for health information in more participatory media, thus having a preference for lay person-generated content (Ma & Atkin, 2017).

Message credibility refers to the influence of message characteristics such as accuracy, clarity, language intensity, discrepancy, information quality/completeness, and

use of evidence on perceptions of credibility (Bacon, 1979; Hamilton, 1998; McCroskey, 1969; Metzger et al., 2003). In line with dual process models such as the elaboration likelihood model (ELM; Petty & Cacioppo, 1986) and heuristic-systematic model (HSM; Chaiken, 1987), message characteristics become more important when involvement and relevance are high. Hence, audience members who centrally process the message will be more affected by the actual qualities of the message as opposed to heuristic cues.

Lastly, *media credibility* focuses on the relative degree to which people trust different media channels (Metzger et al., 2003). In general, credibility of health information on the web seems to be questionable (Berland et al., 2001; Kunst et al., 2002). A comparison of different online platforms by Hu and Sundar (2010) found that even when the same message was presented, collective gatekeeping sources such as health information websites and bulletin boards induced greater changes in behavioral intentions compared with individual gatekeeping sources such as blogs and personal websites. This effect was driven by perceptions that individual gatekeeping sources come with uncertainty due to their lack of monitoring and moderating. Such distrust of information posted on personal websites was similarly found in other studies as well (Flanagin & Miriam, 2007; Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005). YouTube is closer to individual gatekeeping sources such as blogs or personal websites in that content that users choose to post online is largely unregulated. Therefore, there is a possibility that YouTube videos (especially ones that contain misinformation) may not be credible to audience members, such that they are dismissed.

In persuasion research, credibility has long been identified as having a substantial impact on how messages are received (see Pornpitakpan, 2004, for a review). Because

there is limited research on the credibility and persuasiveness of online health information and of user-generated content, this study provides a first step in gauging the direct effectiveness of a class of misleading YouTube videos. To eliminate sources of distraction and to assess the effectiveness of the videos themselves, this study ignores dominant heuristic cues (e.g., social endorsement) that can potentially interact with how the video is received by viewers. Since little is known about the effectiveness of pro-smoking videos on YouTube, the following questions are asked:

RQ1-4: Does exposure to pro-smoking videos negatively affect (1) beliefs, (2) social norms, (3) attitudes, and (4) behavioral intentions associated with smoking?

Method

Subjects

A national convenience sample of 485 U.S. adolescents and young adults between the ages 15 and 21 was recruited through an online research panel, Toluna. Only those with some level of interest in smoking, or, alternatively put, youth with "the absence of a firm decision *not* to smoke," were recruited (Pierce et al., 1996, p. 355). Therefore, youth who did *not* think that they will try a cigarette soon, will *definitely not* smoke a cigarette if one of their best friends were to offer them, and will *definitely not* be smoking cigarettes one year from now were screened out. In other words, only youth at risk of smoking were sampled for this study.

Recruited participants were randomly assigned to one of five conditions. Overall, 60.0% of the sample were female, 63.7% were White, 24.5% had a smoking interest score of 1, 39.0% had a score of 2, and 36.5% had a score of 3. There were no significant

differences in demographic features or smoking interest across the five experimental conditions. This breakdown is outlined in Table IV-1.

Table IV-1. Participant Demographics and Characteristics

	Condition					
	CONTROL (n = 100)	SOC-POS (n = 98)	SOC-NEG (n = 104)	MIS-POS (n = 95)	MIS-NEG (n = 88)	Overall (N = 485)
% Female	57.0%	55.1%	59.6%	66.3%	62.5%	60.0%
M_{age} (SD)	18.68 (1.85)	18.69 (1.81)	18.62 (1.84)	18.60 (2.05)	18.43 (1.72)	18.61 (1.85)
% Non-White	34.3%	32.3%	43.3%	35.8%	40.9%	37.3%
Smoking interest						
% score of 1	21.0%	17.4%	28.9%	25.3%	30.7%	24.5%
% score of 2	45.0%	40.8%	38.5%	37.9%	31.8%	39.0%
% score of 3	34.0%	41.8%	32.7%	36.8%	37.5%	36.5%

Note. There were no significant differences across conditions.

Stimulus Material

Each participant was randomly assigned three videos, based on the condition he or she was in. After the first two exposures, participants were asked smoking-related outcome questions, and after the third exposure, participants were asked evaluation questions. The decision to expose participants to two videos to determine the effectiveness of pro-smoking videos is based on findings from previous chapters where youth who were most interested in smoking selected 1.13 videos (SD = 1.30) on average during a 10-minute browsing period (Study 1), and such viewing patterns were associated with negative smoking-related outcomes (Study 2). As such, in an attempt to expose participants to at least 1.13 videos but not tire them by forcing exposure to too many videos, two videos were shown in full. All videos were less than 3 minutes long (range: 1 minute and 38 seconds to 3 minutes). Videos longer than 3 minutes were edited to be

under 3 minutes in order to help minimize respondent fatigue and dropout rates. Therefore, maximum exposure times were 6 minutes for the first phase and 3 minutes for the second phase.[3]

Stimulus smoking videos were a subset of videos collected by the Annenberg Public Policy Center (APPC) of the University of Pennsylvania. Using a search API, the APPC gathered YouTube videos by inputting 136 tobacco-related keywords.

This study examined four types of pro-smoking videos based on (a) the topic of the video and (b) how they were evaluated by at-risk youth (i.e., youth with interest in smoking). Although there were no hypotheses or research questions based on the type of pro-smoking video, participants were assigned to different classes of pro-smoking videos to see if there were variations in the level of effectiveness based on the type of video. The list of stimulus videos per condition can be found in Table IV-2.

Pro-Smoking Videos

Video topic. The first factor was topic of the video. Specifically, there were two types of videos: Social acceptance videos and misleading claims videos. *Social acceptance pro-smoking videos* consisted of pro-smoking videos that promote pluralistic ignorance about either the prevalence (descriptive norm) or acceptability (injunctive norm) of smoking. These videos portrayed smoking in a positive light, conveying social acceptability of smoking by showing social rewards (e.g., cheering by friends,

[3] Due to concerns that editing video length could potentially undermine the effectiveness of the videos, stimulus videos were selected based on participant evaluations from the selective exposure experiment. On average, all videos used in this study (with the exception of one pro-smoking video), were watched for less than 3 minutes (M = 1.89 minutes, SD = 0.66 minutes). Since participants based their evaluations on relatively short periods of viewings, we felt more comfortable editing videos that were over 3 minutes long. Note that the maximum video length was 5 minutes for the selective exposure study (Study 1).

desirability/attractiveness). One example would be a video in which a young man smokes a whole cigarette in one drag in front of a group of friends. In this video, social approval is apparent from the anticipation and cheering of friends around him (e.g., "that's a real champ right there"). As these videos contained indirect references and visuals that were problematic, the misleading information here is mostly visual and inferential.

Next, *misleading claims pro-smoking videos* were videos that contain misleading implicit or explicit claims related to an aspect of smoking. The format of these videos could either be testimonials or tutorials but all of them downplayed the health consequences of smoking while emphasizing the benefits. These videos often use the "false equivalency" argument to downplay health consequences. For example, equating the risks of smoking to the risks of dying in a car accident, walking down the street, or drinking tap water implies that the risks of the two are equivalent. Other videos emphasize the benefits of smoking (and largely ignore the costs of smoking) by talking about how smoking feels good, how smoking allows you to take more breaks, how smoking helps you get promoted, among some examples. The misinformation (or misleading information) here is usually based on actual claims made in the videos.

Evaluations. The second factor was based on the evaluations participants made of pro-smoking videos from the aforementioned selective exposure study. In Study 1, after the exposure phase where participants were allowed to view video(s) of their choice out of a set of videos that consisted of eight smoking videos and eight non-smoking videos, participants evaluated the top two videos that they watched the most. Based on these evaluations, this study used pro-smoking videos that received stronger (positive) or weaker (negative) evaluations by youth interested in smoking.

Positively evaluated pro-smoking videos consisted of videos that were viewed for more than halfway through, on average, once selected. Out of this set of videos, videos that had more views (> 15 views) and were evaluated more positively by youth with high interest in smoking versus youth with low interest in smoking were identified. Thus, the resulting four social acceptance videos and four misleading claims videos in this category were videos that were relatively well-received by at-risk youth (average positive reaction scores = 2.37; average engagement scores = 2.76; average % watched = 64.0%).

Negatively evaluated pro-smoking videos were videos that were, on average, viewed for less than 40% once selected. In other words, these were videos that were selected by at-risk youth but rejected, to an extent. Consistently, four social acceptance videos and four misleading claims videos that had the weakest evaluations among this set of pro-smoking videos were chosen (average positive reaction scores = 1.89; average engagement scores = 2.22; average % watched = 29.1% by youth interested in smoking).

Non-Smoking Control Videos

Non-smoking control videos were topically matched to the format of pro-smoking videos. Specifically, four social acceptance control videos and four tutorial/testimonial control videos were chosen. Videos that were evaluated more positively than average by youth with interest in smoking and viewed (on average) for less than 3 minutes were selected. The reasoning behind this was to test the effectiveness of pro-smoking videos against videos that the target population found relatively appealing and also to identify videos that were evaluated positively regardless of being viewed for less than 3 minutes (because the videos were edited to be under 3 minutes long).

Table IV-2. List of Videos Per Condition

Condition	Video topic	Evaluation	Video list	Youth w/ interest in smoking	
				# views	Average % watched
1 SOC-POS	Pro-smoking social acceptance (*n* = 4)	Positive	Hollywood/Celebs Smokers	16	64%
			man smokes a whole cigarette in one drag	10	59%
			1 cigarette 1 drag	22	55%
			KC smokes a whole cigarette in record time	13	60%
2 SOC-NEG	Pro-smoking social acceptance (*n* = 4)	Negative	How To Smoke a Cigarette	8	32%
			Justin Bieber Sexy Schoolgirls Smoking 360p	10	37%
			Supermodels Smoking	9	27%
			Pete Firman's Illegal Smoking Trick	6	29%
3 MIS-POS	Pro-smoking misleading claims (*n* = 4)	Positive	How To Smoke A Cigarette And Look Cool (REAL VERSION!!!)	16	68%
			Warning Labels on Tobacco Products - RANT	18	61%
			Smoking is good for you! Rant.	8	80%
			The Pros of Smoking Cigarettes	7	64%
4 MIS-NEG	Pro-smoking misleading claims (*n* = 4)	Negative	How to Hide smoking & the smell	18	34%
			How To Look As Cool As Possible. (While smoking a cigarette)	14	29%
			How to smoke a cigarette!	13	23%
			SMOKING IS COOL!	15	18%
5 CONTROL	Non-smoking social acceptance (*n* = 4)	n/a	Internet Friends//Break the Distance	16	36%
			Cutest Promposal Ever! Pella High School Senior Boys Dance to One Direction!	37	67%
			Suns Fan Hits $77,777 Halfcourt Shot!	13	56%
			Sweet 16 Court Dance + Father & Daughter Battle	22	41%
	Non-smoking tutorial/testimonial (*n* = 4)	n/a	How to make your pc/laptop run faster (3 simple steps)	33	53%
			MY JOURNEY THROUGH MEDICAL SCHOOL | #4 Medical School Series | AdannaDavid	23	50%
			MY COMING OUT STORY!	47	51%
			My Experience Traveling Alone | Lana	25	37%

Design

All procedures were reviewed and approved by the Institutional Review Board at the University of Pennsylvania, where the study was conducted. This study employed a 2 (Pro-smoking video topic: Social acceptance, misleading claims) × 2 (Evaluations: Positively evaluated, negatively evaluated) between subjects factorial design. There was also a set-aside control (see Figure IV-1).

Figure IV-1. Study 3 Design

		Pro-smoking video topic	
		Social acceptance	Misleading claims
Evaluations	Positively evaluated	**SOC-POS**	**MIS-POS**
	Negatively evaluated	**SOC-NEG**	**MIS-NEG**
			Non-smoking (control) video **CONTROL**

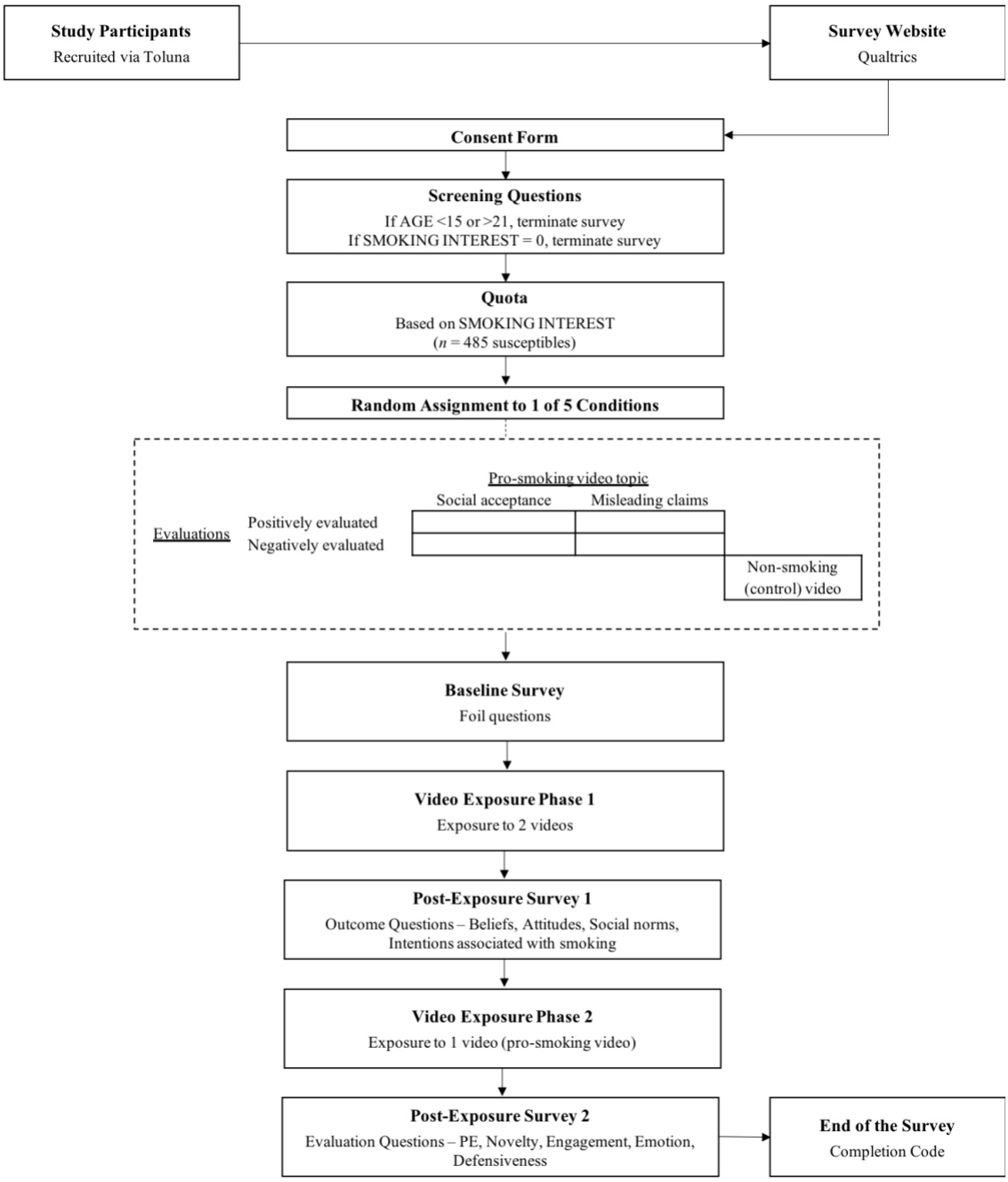
The survey company, Toluna, recruited participants who were part of their online youth panel. After providing informed consent, participants answered screening questions on age and smoking interest in order to confirm eligibility in terms of our predetermined quotas. All eligible participants were then randomly assigned to one of five conditions.

To discourage participants from guessing the purpose of this study, participants were asked to fill out a pre-test questionnaire that contained foil questions, asking participants about their social media use and personality characteristics (sensation seeking, regulatory focus, need for cognition, and need for affect). The cover story was that University of Pennsylvania researchers were developing an algorithm to make video recommendations based on people's characteristics.

All participants were exposed to three unique videos. After they viewed the first two videos, they answered some smoking outcome-related questions, and after the last exposure (which was always a pro-smoking video), participants were asked to evaluate the video. During the first exposure phase, participants were forced to be exposed to two full videos, based on the condition they were in. All participants in the treatment conditions viewed two randomly assigned pro-smoking videos and all participants in the control condition viewed two randomly assigned non-smoking videos. Participants were not allowed to pause or proceed to the next phase of the study until the video stopped playing. After these two exposures, participants answered smoking outcome questions (beliefs, attitude, self-efficacy, intention, and ambivalence related to smoking).

Next, all participants – even those in the control condition – were shown one pro-smoking video. This was to ensure a fairly large number of evaluations per message (approximately 25 per video) so that we could obtain stable evaluations, following the recommendation by Cappella and Kim (2017). Like before, participants were not able to pause or proceed to the next phase of the study until the video stopped playing. After viewing the last video, participants were asked to evaluate the video (perceived effectiveness, defensiveness, emotional response, and engagement). Then, participants were asked demographics questions. Lastly, participants were debriefed. Figure IV-2 illustrates the procedure of the study.

Figure IV-2. Study 3 Procedure Flow Chart



Recall that in the selective exposure experiment (Study 1), participants viewed 0.71 pro-smoking videos and watched 1.13 minutes of pro-smoking video content on

average, and that this exposure pattern was associated with more positive attitudes and social norms associated with smoking (Study 2). There were two design features that were in place in order to heighten the impact of pro-smoking videos.

The first is greater exposure. By forcing exposure to two pro-smoking videos, participants watched pro-smoking videos for an average of 5.23 minutes, which is approximately four to five times the average exposure participants had to pro-smoking videos in Study 1. Second, the choice of stimulus materials was based on a careful analysis of post-exposure reactions to the pro-smoking videos by youth with interest in smoking. The videos that elicited greater positive reactions and engagement were chosen for this study, in the case of positively evaluated videos. Therefore, this set of pro-smoking videos has the potential to be particularly persuasive to at-risk youth.

Measures

Smoking Interest

Smoking interest (adapted from Pierce et al., 1996) was measured by three items: (a) "Do you think you will try a cigarette soon?"; (b) "If one of your friends were to offer you a cigarette, would you smoke it?"; and (c) "Do you think you will be smoking cigarettes 1 year from now?" Those who answered "No," "Definitely not," and "Definitely not" respectively were dropped as they had complete disinterest in smoking; otherwise their responses were scored 1. Their scores were summed yielding an interest scale varying from 1 to 3. Higher scores indicate greater interest in smoking.

Smoking-Related Outcome Variables

Beliefs. Smoking-related beliefs were adapted from Brennan and colleagues' (2013) study that identified promising themes and beliefs for a youth anti-smoking

campaign (Brennan, Gibson, Momjian, & Hornik, 2013). Participants saw a list of statements about smoking and indicated their degree of agreement with each statement on a 5-point Likert-type scale with answer options ranging from 1 (*very unlikely*) to 5 (*very likely*). Results from a principal component analysis yielded two classes of beliefs: (a) Perceived benefits of smoking and (b) correct beliefs about the health risks of smoking (see Appendix E).

Misleading beliefs about the benefits of smoking encompassed social perceptions associated with smoking (e.g., "If I smoke every day, I will look cool"), mood effects (e.g., "If I smoke every day, I will be able to forget about my problem"), as well as other external benefits (e.g., "If I smoke every day, I will get more breaks"). Higher scores indicate that participants held more *misleading (unfavorable)* beliefs about the benefits of smoking (Cronbach's $\alpha = .91$, $M = 2.64$, $SD = 0.91$).

Correct beliefs about the health risks of smoking incorporated beliefs associated with addiction (e.g., "If I smoke every day, I will be controlled by smoking"), health effects (e.g., "If I smoke every day, I will develop cancer"), and youth susceptibility to health effects (e.g., "If I smoke every day, I will be just as likely to damage my body as an adult smoker would"). Higher scores indicate that participants held more *correct (favorable)* beliefs about the health risks of smoking (Cronbach's $\alpha = .87$, $M = 3.85$, $SD = 0.79$).

Social norms. Social norms about peer prevalence/acceptance of smoking were measured by items adapted from Brennan and colleagues (2013). Participants indicated their degree of agreement with each statement on a 5-point Likert-type scale with answer options ranging from 1 (*very unlikely*) to 5 (*very likely*). An example item is as follows:

"If I smoke every day, I will be more like everyone else." Higher scores indicate more favorable normative perceptions about peer smoking (Cronbach's α = .80, *M* = 2.80, *SD* = 0.95).

Attitudes. Attitudes toward "my smoking every day" was measured using five items on a 7-point semantic differential scale that consists of a set of bipolar adjective pairs such as "bad/good," "unenjoyable/enjoyable," "unpleasant/pleasant," "foolish/wise," and "harmful/beneficial." Negative scores indicate negative attitudes and positive scores indicate positive attitudes toward smoking cigarettes (Cronbach's α =.93, *M* = -1.65, *SD* = 1.57).

Intentions. Participants' intentions toward smoking were measured with items adapted from Brennan and colleagues (2013). *Intentions to smoke* ranged from 1 to 5 with higher scores indicating greater intentions to smoke cigarettes (*M* = 2.47, *SD* = 1.47). Those with a score of 1 were those who are *unlikely* to smoke even *one or two puffs* over the next year; 2 were those who are *neither likely nor unlikely* to smoke even *one or two puffs* over the next year; 3 were those who are *likely* to smoke *one or two puffs* over the next year; 4 were those who are *likely* to smoke, *but not every day*, one year from now; and 5 were those who are *likely* to smoke *every day* one year from now.

Intentions to smoke other forms of tobacco were also measured – specifically, intention to use other forms of tobacco (e.g., cigars, water pipes, little cigars, pipes) and smokeless tobacco (e.g., chewing tobacco, snuff, dip) were asked (Pearson's *r* = .62, *p* < .001, *M* = 2.12, *SD* = 1.14).

Self-efficacy. Self-efficacy was adapted from Zhao and Cappella (2008). The questions asked participants how confident they were that they could say no to a cigarette

in the following circumstances: (a) if they are at a party where most people are smoking; (b) if a very close friend offers it; (c) if they are home alone and feeling sad or bored; (d) if they are on a school property and someone offers it; and (e) if they are hanging out at a friend's house whose parents are not home. Participants indicated their responses on a 5-point Likert-type scale with answer options ranging from 1 (*not at all sure*) to 5 (*completely sure*). Higher scores indicate greater self-efficacy to refuse a cigarette offer (Cronbach's α =.90, *M* = 3.78, *SD* = 1.12).

Ambivalence. Ambivalence was adapted from Zhao and Cappella's (2008) study on the effect of ambivalence on adolescents' attitudes toward marijuana use. Participants were asked how *positive* or *negative* they felt about their smoking in the next year. They indicated the extent to which they felt positive or negative on a 5-point Likert-type scale with answer options ranging from 1 (*not at all*) to 5 (*extremely*). Responses to the two unipolar questions were combined using Griffin transformation and by adding a constant of 1 so that the measure ranged from 0 to 6.[4] Higher scores indicate greater ambivalence towards smoking (*M* = 2.25, *SD* = 1.75).

The correlations among all smoking-related outcome variables are listed in Table IV-3. Note that correlations are in the expected direction (e.g., correct beliefs about the health risks of smoking are negatively associated with smoking attitudes and intentions).

[4] These two items were transformed into a single measure through the Griffin calculation: Ambivalence = (Positive evaluation score + Negative evaluation score)/2 – abs (Positive evaluation score – Negative evaluation score). A constant of 1 was added to the scores so that the lower bound would become 0 and the measure would range from 0 to 6 (Thompson, Zanna, & Griffin, 1995; Zhao & Cappella, 2008).

Table IV-3. Correlations among Smoking-Related Outcome Variables

		1	2	3	4	5	6	7
1	Misleading beliefs about the benefits of smoking	——						
2	Correct beliefs about the health risks of smoking	–.01	——					
3	Social norms about smoking	.75***	–.01	——				
4	Attitude towards smoking	.61***	–.19***	.51***	——			
5	Intentions to smoke cigarette	.59***	–.12**	.49***	.72***	——		
6	Intentions to smoke other forms of tobacco	.56***	–.15**	.47***	.64***	.59***	——	
7	Self-efficacy to resist cigarette offer	–.02	.27***	.06	–.12**	–.17***	–.07	——
8	Ambivalence towards smoking	.47***	–.13**	.40***	.48***	.44***	.50***	–.10*

Video Evaluations

Credibility. Credibility was assessed by three items: (a) this video was believable; (b) this video was convincing; and (c) the information presented in the video was accurate. Higher scores indicate greater credibility of the video (Cronbach's α = .77, M = 2. 65, SD = 1.02).

Perceived effectiveness. Perceived effectiveness was assessed by measures developed and validated by Zhao and colleagues (2011). Participants indicated whether the video they saw was (a) believable; (b) convincing; (c) important to them; (d) taught them something new; (e) put thoughts in their mind about trying/smoking cigarettes; and (f-g) put thoughts in their mind about the benefits/harms of cigarettes (Zhao, Strasser, Cappella, Lerman, & Fishbein, 2011). Response options ranged from 1 (*strongly*

disagree) to 5 (*strongly agree*). As suggested by Zhao et al. (2011), unfavorable thoughts scores (i.e., harms of cigarettes) were subtracted from the favorable thoughts scores (i.e., benefits of cigarettes) to generate a thought favorability index. Since the resulting index had a potential range from -4 to +4, it was converted to a 5-point scale by dividing the resultant score by two and adding a constant of three. Averaging five items created a composite perceived effectiveness scale; as a proxy measure of persuasiveness, higher scores indicate greater persuasiveness (Cronbach's α = .81, M = 2.54, SD = 0.91).

Defensiveness. Defensiveness was measured with four items on a 4-point Likert-type scale with answer options ranging from 1 (*not at all*) to 4 (*very much*). The question stem asked "To what extent do you believe the information presented in the video" and response options included (a) is exaggerated; (b) is dishonest; and (c) tries to manipulate me. Higher scores indicate more defensiveness towards the video (Cronbach's α = .70, M = 2.40, SD = 0.85).

Emotion. Emotional responses were measured by asking participants how much of each of the following words described how they felt while viewing the video. Participants were asked to rate 11 items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Positive emotional responses included hopeful, proud, enthusiastic, eager, and motivated. Negative emotional response included worried, guilty, disgusted, sad, regretful, and angry. Higher scores indicate more positive or negative emotions when viewing the video, respectively (Positive emotions: Cronbach's α = .93, M = 2.13, SD = 1.06; Negative emotions: Cronbach's α = .78, M = 2.87, SD = 0.87).

Engagement. Engagement was measured by four items adapted from transportation scales (e.g., "my attention was fully captured") on a 4-point Likert-type scale with answer options ranging from 1 (*not at all*) to 4 (*very much*). Higher scores indicate greater engagement with the video (Cronbach's $\alpha = .76$, $M = 2.19$, $SD = 0.79$).

Empathy. Empathy was measured by two items: (a) I felt the person/people in the video was/were interesting and (b) I was touched by the video I just viewed. Participants indicated their degree of agreement on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate greater levels of empathy while viewing the video (Pearson's $r = .62$, $p < .001$, $M = 2.54$, $SD = 1.20$).

Analysis

The main analyses of interest were whether condition affected smoking-related outcomes – specifically, beliefs (RQ1), social norms (RQ2), attitudes (RQ3), and behavioral intentions (RQ4) associated with smoking. Separate one-way analysis of variance (ANOVA) models were fitted to compare condition means with control group means on each of the aforementioned smoking-related outcomes as the dependent variables. Planned contrasts were conducted to examine whether (a) each of the treatment conditions differed from the control condition; and (b) whether positively evaluated pro-smoking videos differed from the control condition (i.e., Conditions 1 & 3 vs. Control). The latter test was conducted because these were the set of videos that were evaluated the most positively by at-risk youth in an earlier study. All tests were run on Stata 12.0 (StataCorp, 2011).

Additional analyses. Further analyses were conducted to see if there were any potential moderating effects based on subgroup characteristics such as smoking interest scores, sensation seeking, age, gender, and race/ethnicity. Video-level evaluations were also examined to see if the evaluations revealed potential explanations for why or why not pro-smoking videos were effective.

Results

This study was interested in whether exposure to pro-smoking videos was associated with negative smoking-related outcomes. Participants were either exposed to two pro-smoking videos or two non-smoking (control) videos and then their responses to smoking-related outcomes were compared. The details of the conditions are described in Table IV-4.

Table IV-4. Condition Description and Breakouts

		Condition	Video type		n (%)
			Pro-smoking video topic	Evaluations	
1	SOC-POS	Treatment	Social acceptance	Positively evaluated	98 (20.2%)
2	SOC-NEG	Treatment	Social acceptance	Negatively evaluated	104 (21.4%)
3	MIS-POS	Treatment	Misleading claims	Positively evaluated	95 (19.6%)
4	MIS-NEG	Treatment	Misleading claims	Negatively evaluated	88 (18.1%)
5	CONTROL	Control	Non-smoking		100 (20.6%)
				TOTAL	485 (100.0%)

Mean and standard deviations for all smoking-related outcome measures are reported in Table IV-5.

Table IV-5. Mean (Standard Deviation) of Outcome Measures

Outcome measure	CONTROL (*n* = 100)	SOC-POS (*n* = 98)	SOC-NEG (*n* = 104)	MIS-POS (*n* = 95)	MIS-NEG (*n* = 88)
Misleading beliefs about benefits of smoking (+)	2.75 (0.91)	2.61 (0.85)	2.67 (0.93)	2.64 (0.92)	2.51 (0.92)
Correct beliefs about smoking health risks (-)	3.71 (0.90)	3.85 (0.76)	3.85 (0.84)	3.87 (0.74)	4.01 (0.65)
Social norms about peer smoking (+)	2.85 (0.99)	2.78 (0.81)	2.85 (0.90)	2.81 (1.00)	2.72 (1.06)
Attitudes toward smoking (-)	–1.48 (1.68)	–1.84 (1.46)	–1.65 (1.60)	–1.67 (1.47)	–1.61 (1.64)
Intentions to smoke cigarette (+)	2.54 (1.50)	2.31 (1.45)	2.55 (1.49)	2.42 (1.41)	2.53 (1.52)
Intentions to smoke other tobacco (+)	2.21 (1.19)	2.16 (1.10)	2.03 (1.12)	2.04 (1.18)	2.17 (1.12)
Self-efficacy to resist cigarette offer (-)	3.67 (1.11)	3.74 (1.04)	3.77 (1.19)	3.89 (1.10)	3.87 (1.14)
Ambivalence towards smoking (+)	2.21 (1.78)	2.08 (1.77)	2.40 (1.72)	2.31 (1.79)	2.25 (1.72)

Note. The signs in parentheses after each outcome measure represents the expected direction of results (i.e., treatment conditions having more negative outcomes). Specifically, a positive sign means that it is expected that the treatment conditions have greater values than the control condition and vice versa.

The main ANOVA test (IV: condition, DV: outcome variable) as well as the planned contrasts conducted for each respective outcome variable is reported in Table IV-6. In short, there were no significant differences between the control condition and the treatment conditions with respect to any of the smoking-related outcomes. In fact, the patterns of effect were in the opposite direction: Participants who viewed pro-smoking videos had less negative smoking-related outcomes compared with participants who viewed non-smoking videos, although the difference was not significant. Details are reported below.

Table IV-6. Main Test and Planned Contrasts

Outcome measure	Main test			Planned contrasts													
				SOC-POS vs. CONTROL			SOC-NEG vs. CONTROL			MIS-POS vs. CONTROL			MIS-NEG vs. CONTROL			SOC-POS & MIS-POS vs. CONTROL		
	df	*F*	*p*	*df*	*F*	*p*	*df*	*F*	*p*	*df*	*F*	*p*	*df*	*F*	*p*	*df*	*F*	*p*
Misleading beliefs about smoking benefits	4, 480	.86	.49	1, 480	1.20	.27	1, 480	.39	.53	1, 480	.68	.41	1, 480	3.19	.08	1, 480	1.24	.27
Correct beliefs about smoking health risks	4, 480	1.69	.15	1, 480	1.66	.20	1, 480	1.61	.21	1, 480	2.00	.16	**1, 480**	**6.71**	**.01**	1, 480	2.45	.12
Social norms about peer smoking	4, 480	.32	.86	1, 480	.28	.60	1, 480	.00	.98	1, 480	.11	.74	1, 480	.89	.35	1, 480	.25	.62
Attitudes toward smoking	4, 480	.65	.63	1, 480	2.50	.11	1, 480	.56	.46	1, 480	.68	.41	1, 480	.29	.59	1, 480	1.94	.16
Intentions to smoke (cigarette)	4, 480	.50	.74	1, 480	1.24	.27	1, 480	.00	.97	1, 480	.32	.57	1, 480	.00	.98	1, 480	.94	.33
Intentions to smoke (other)	4, 480	.52	.72	1, 480	.10	.75	1, 480	1.28	.26	1, 480	1.12	.29	1, 480	.06	.81	1, 480	.64	.42
Self-efficacy to resist cigarette	4, 480	.64	.63	1, 480	.25	.62	1, 480	.42	.52	1, 480	1.89	.17	1, 480	1.56	.21	1, 480	1.18	.28
Ambivalence towards smoking	4, 480	.47	.76	1, 480	.27	.61	1, 480	.62	.43	1, 480	.18	.68	1, 480	.03	.86	1, 480	.00	.96

Note. This table presents the ANOVA results (IV: Condition, DV: Each outcome measure in column 1). Each row represents a separate test. The main tests conducted are highlighted in gray (column 2). Planned contrasts that were conducted are listed in columns 3-7. Significant results are bolded.

The first research question asked whether smoking-related beliefs were affected by exposure to pro-smoking videos. First, analyses were conducted to see whether misleading beliefs about the benefits of smoking differed based on condition. No significant main effects emerged for beliefs about the benefits of smoking, $F(4, 480) = 0.86$, $p = .491$. Planned contrasts revealed that each of the conditions did not differ from the control condition. In addition, conditions 1 and 3 together did not differ from the control condition, $F(1, 480) = 1.24$, $p = .267$. Second, the effect of condition on correct beliefs about the health risks of smoking was tested. No significant main effects were found, $F(4, 480) = 1.69$, $p = .151$, and planned contrasts revealed that with the exception of one contrast, each of the conditions was not different from the control condition. But even the significant contrast, MIS-NEG vs. CONTROL, was in the opposite direction, $F(1, 480) = 6.71$, $p = .01$. Also, conditions 1 and 3 jointly did not differ from the control condition, $F(1, 480) = 2.45$, $p = .118$. Overall, the pattern of effects was in the opposite direction with participants in the treatment conditions having less misleading beliefs about the benefits of smoking and more correct beliefs about the health risks of smoking compared with those in the control condition.

The second research question was concerned with the effect of exposure to pro-smoking videos on social norms about peer prevalence and acceptance of smoking. ANOVA results revealed no direct effect of condition on social norms, $F(4, 480) = 0.32$, $p = .865$. Planned contrasts of each of the conditions against the control condition were insignificant, as well as the contrast between conditions 1 and 3 against the control condition, $F(1, 480) = 0.25$, $p = .619$. In contrast to expectations, participants who

watched pro-smoking videos actually believed that smoking was less prevalent and well-accepted by peers compared with those who watched control videos.

The third research question asked whether exposure to pro-smoking videos affected attitudes toward smoking. Results showed that there was no significant effect of condition on attitudes, $F(4, 480) = 0.65$, $p = .630$. Planned contrasts revealed that the treatment conditions did not differ from the control condition. In addition, conditions 1 and 3 together did not differ significantly from the control condition, $F(1, 480) = 1.94$, $p = .165$. Consistent with the pattern of effects, participants exposed to pro-smoking videos had more negative attitudes toward smoking compared with those exposed to non-smoking videos.

The fourth and last research question was concerned with behavioral intentions associated with smoking. Analysis revealed that there was no effect of condition on behavioral intentions to smoke cigarettes, $F(4, 480) = 0.50$, $p = .737$, or other forms of tobacco, $F(4, 480) = 0.52$, $p = .724$. There were no differences between each of the treatment conditions and the control condition. Moreover, conditions 1 and 3 were not significantly different from the control condition: $F(1, 480) = 0.94$, $p = .333$ for intentions to smoke cigarettes, $F(1, 480) = 0.64$, $p = .425$ for intentions to smoke other forms of tobacco.

Note that other smoking-related outcomes that were measured such as self-efficacy to resist a cigarette offer and ambivalence towards smoking also were not significantly different based on condition. For more details, see Table IV-5 and Table IV-6.

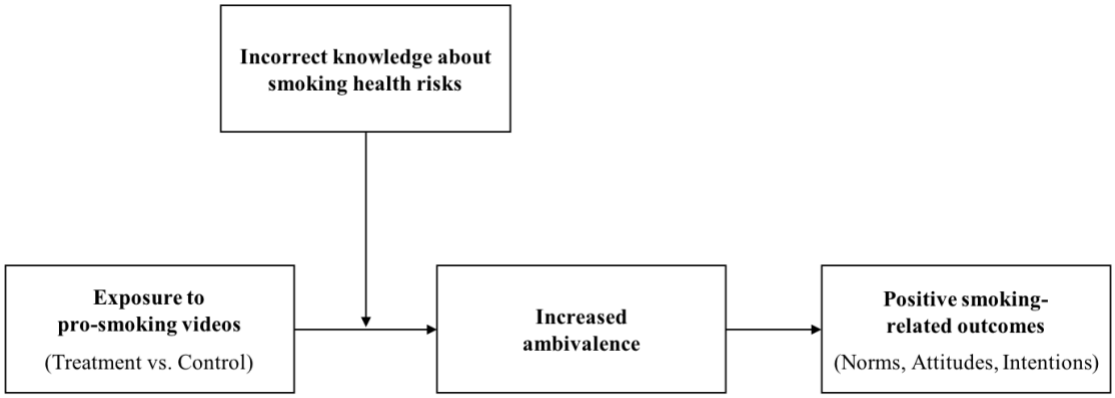
Additional analyses. Additional analyses revealed that there were no moderating effects based on subgroup characteristics (smoking interest scores, sensation seeking, age, gender, and race/ethnicity; see Appendix F for details). Video-level evaluations were also examined but no clear explanation for why pro-smoking videos were ineffective was found. These set of analyses are reported in Appendix G and Appendix H.

Discussion

Although the presence of pro-smoking videos on YouTube alone has caused public health practitioners to worry about the potential deleterious effects these videos may have on at-risk youth, results of this study show that there is no direct evidence that exposure – at least short-term exposure – will impact smoking-related outcomes for youth interested in smoking.

With regard to the research questions, exposure to pro-smoking videos did not negatively affect beliefs, social norms, attitudes, or behavioral intentions associated with smoking. In fact, contrary to expectations, trends indicate that participants who viewed two pro-smoking videos actually had *less* negative smoking-related outcomes compared with those who viewed two non-smoking control videos (although not statistically significant). Additional analyses did not reveal any moderation effects nor empirical accounts as to why pro-smoking videos were ineffective. Therefore, the mechanisms for their ineffectiveness still remain unclear.

Figure IV-3. Conceptual Scheme of Conditional Indirect Effects



Note. A conceptual diagram of the conditional indirect effect of exposure to pro-smoking videos on positive smoking outcomes, through increased ambivalence, moderated by incorrect knowledge about smoking health risks.

To gain some understanding about the lack of effects, further exploratory analyses were conducted to examine if youth who had correct beliefs about the health risks of smoking affected the results in any way. Despite that these beliefs were measured after exposure, because none of the videos contained correct health information regarding smoking, we treated this measure as if it were an exogenous measure of prior knowledge about the risks of smoking and divided youth into two groups: Those that had either correct or incorrect knowledge about smoking health risks. Support was found for *moderated mediation* (see Preacher, Rucker, & Hayes, 2007). A conceptual scheme of the conditional indirect effects observed is displayed in Figure IV-3. Specifically, there was a positive conditional indirect effect of exposure to pro-smoking videos (versus control videos) on favorable smoking-related outcomes through increased levels of ambivalence, which was observed for participants who had incorrect knowledge about smoking health risks, but not for those who had correct knowledge (*Social norms*: 0.19, 95% bootstrap CI

= 0.03 to 0.38; *Attitudes*: 0.39, 95% bootstrap CI = 0.05 to 0.75; *Intentions to smoke*: 0.33, 95% bootstrap CI = 0.03 to 0.64). For more details, refer to Appendix I.

While these findings are limited in that the variables – with the exception of exposure – were measured at the same time, they allow us to gain at least a partial understanding of the lack of effects. It appears that prior knowledge about the health risks of smoking can differentially affect how ambivalent individuals feel towards smoking when they are exposed to pro-smoking messages, which subsequently influences their norms, attitudes, and intentions associated with smoking. Future studies should direct more attention to understanding the mechanism behind the effects (or lack thereof) of pro-smoking videos.

Other possibilities are considered here. First of all, recall that there were no significant differences across conditions in terms of demographics or levels of smoking interest. Therefore, the possibility that the control group consisted of youth who were different from those in the treatment groups is minimal. Setting this concern aside, an alternative account for the lack of effects is limited exposure. Due to respondent fatigue concerns, participants were only shown two pro-smoking videos – with the maximum length for each video being 3 minutes – prior to assessing video effectiveness. The natural question that follows is, is up to 6 minutes of exposure adequate in bringing about changes in smoking-related outcomes? While the findings of this study indicate that pro-smoking YouTube videos are not effective, it could be the case that exposure over longer periods of time as well as repeated exposure to these videos bring about behavioral outcomes. After all, studies have shown that repeated exposure – even exposure to

questionable information – can make the information appear credible due to familiarity effects (Begg, Anas, & Farinacci, 1992; Weaver, Garcia, Schwarz, & Miller, 2007).

Another reason for the lack of effects could be due to the sensational nature of the video content, which lowered message credibility. Since only evaluations of pro-smoking videos were collected, it is impossible to compare how pro-smoking videos were evaluated against those of other types of videos, but from the pro-smoking video evaluations alone, it is evident that the emotional response of "disgust" was very high (M = 3.64, SD = 1.18) even compared with other negative emotions such as "sad" (M = 2.85, SD = 1.30) or "angry" (M = 2.79, SD = 1.288). Additional analysis of video evaluations by the target population (i.e., youth interested in smoking) obtained from Study 2 reveals that pro-smoking videos tend to bring about more negative emotions (M = 3.01, SD = 0.97) compared with non-smoking control videos (M = 1.98, SD = 0.91), $t(525) = 10.24$, $p < .001$. Furthermore, consistent with this study, pro-smoking videos were found to elicit more feelings of "disgust" (M = 3.23, SD = 0.12) versus non-smoking videos (M = 1.94, SD = 0.06), $t(525) = 9.95$, $p < .001$. While it is not possible to know the specific reason why participants felt this way, disgust is a fairly strong emotional response. High levels of disgust could possibly signal that participants were put off by content of the message itself (for instance, the arguments made in the video could have appeared inconsistent or illogical), especially for individuals who were highly involved in the topic of smoking and/or had correct knowledge about smoking. It is also likely that the shocking nature of the video distracted from the actual content of the video, such that persuasion failed to take place.

Relatedly, the possibility that the person(s) or source(s) portrayed in pro-smoking videos were not very trustworthy or likeable is also considered. Recall that in Study 2, while there were significant differences in the evaluations of pro-smoking videos between youth with high interest in smoking (engagement: $M = 2.68$, $SD = 1.00$; positive reactions: $M = 2.33$, $SD = 1.09$) and youth with low interest in smoking (engagement: $M = 2.25$, $SD = 0.76$; positive reactions: $M = 1.84$, $SD = 0.92$), the scores were mid-level, even for high risk youth. Therefore, one can argue that, comparatively speaking, although pro-smoking videos were better received by youth with higher levels of interest in smoking, overall, they were not very positive or engaging. Compared with positive portrayals of smoking in entertainment media where smoking is glamorized by depictions of attractive people smoking, this set of YouTube videos often contains angry smokers who rant or argue that smoking is "cool" or just as dangerous as other mundane activities like "driving a car." Research has found that sources that use opinionated, intense language are seen as being less credible (Hamilton, 1998). The people in pro-smoking videos may have appeared biased or untrustworthy such these videos slightly dissuaded at-risk youth; despite their interest in smoking, participants could have found it difficult to identify with the person(s) in the videos because they are not just everyday smokers, they are at an extreme.

What is more, it could be that the relatively new platform of YouTube is an untrustworthy source of information. Due to lack of gatekeeping, audience members may be wary of health-related advice posted by lay individuals who are not experts, especially when it comes to seemingly dangerous or risky recommendations. Such distrust could have been more pronounced in this study when there was no social feedback present,

which made it increasingly difficult for individuals to judge the quality of the information that was being presented to them. Research has shown that external cues such as number of views, likes, comments, or the quantity and recency of posts serve as heuristics for credibility on YouTube (Mir & Rehman, 2013; Westerman, Spence, & Van Der Heide, 2014). Other research has similarly documented that both the presence and valence of online comments affect perceived effectiveness of YouTube videos (Shi et al., 2014). The absence of such information, coupled with the high possibility that participants of the study did not know or recognize the YouTuber whose video was shown, it may have been difficult for them to make judgments of the source and message and hence be persuaded. While this study largely ignored the interactive dynamics of YouTube to assess the effectiveness of the videos themselves, these are factors that influence video perceptions. Therefore, presenting the videos in a more YouTube-like setting could have resulted in different evaluations.

Finally, it is important to recognize the difference in the ways individuals were exposed to pro-smoking videos: Forced exposure versus selective exposure. While participants in the present study were forced to be exposed to two pro-smoking videos, participants in Study 1 selectively chose to expose themselves to pro-smoking videos out of a set of choices. This could be why there were inconsistencies in Studies 2 (where we found a positive association between viewing pro-smoking videos and smoking-related outcomes) and 3 (where we found no effects of pro-smoking videos on smoking-related outcomes). Although the amount of exposure to pro-smoking content could have been similar or even greater in this study, there is a big difference in choosing pro-smoking

videos for viewing and being forced to view pro-smoking videos. The former may be a necessary (albeit not sufficient) condition for persuasion to occur.

There are some limitations of this study that should be mentioned. As suggested above, there are caveats associated with forcing exposure to videos. Participants were not allowed to pause the video or proceed to the next section of the study until the video stopped playing. This may have not only resulted in unnatural viewing conditions but could have also unintentionally elicited feelings of annoyance and/or reactance that led participants to respond against the videos that they viewed, especially for those in the treatment conditions who were forced to view consistently-themed messages. This could have been exacerbated by the personality traits of the target population – youth interested in smoking – who tend to be high in sensation seeking and typically do not appreciate restrictions on freedom.

Another possibility is that, despite the cover story, forced exposure to pro-smoking videos alerted those in the treatment group to the motives of the study. These respondents may have been especially unwilling to report that pro-smoking videos had an impact on them due to impression management or social desirability concerns. Because there were several indicators that could have allowed treatment group participants to guess that this study had something to do with smoking, there is a high chance that this awareness affected the way they responded.

While forced exposure allows a rather straightforward assessment of whether exposure has any direct effects, it does present a rather artificial setting for viewing videos because this is not how videos are typically viewed on YouTube. Measuring exposure has been an ongoing challenge in communication research (see Liu & Hornik,

2016), and future research should consider ways in which exposure to YouTube videos can be measured less obtrusively by utilizing features of the platform.

A second limitation of the study is that because only evaluations of pro-smoking videos were collected, it was not possible to compare evaluations of pro-smoking videos with those of non-smoking videos. It would have been interesting to see, for instance, if message characteristics such as perceived effectiveness, emotional responses, or engagement mediated the ineffectiveness of the pro-smoking videos. As of now, the mechanisms for the lack of effects are unclear due to constraints in data collected.

Future studies should focus on identifying moderators or mediators that provide explanations as to how online user-generated content is received and processed by audience members. Due to increasing opportunities for users to generate content and the rise of misinformation that subsequently followed, it has become more important to understand if such content can be influential and, if so, under what circumstances.

This study attempted to answer the question of whether exposure to pro-smoking videos resulted in negative smoking-related outcomes. While Study 2 suggested there was a significant association, the results were correlational. The findings of this study indicate that pro-smoking videos have no causal effect: Exposure to pro-smoking YouTube videos did not have any negative effects on at-risk youths' beliefs, norms, attitudes, or behavioral intentions associated with smoking. The next chapter concludes by summarizing the dissertation and entertaining some other possibilities in tying together the results that were found. Future directions as well as policy implications are also discussed.

CHAPTER V | DISCUSSION AND CONCLUSION

Summary of Findings

The presence and prevalence of misleading and positive portrayals of smoking on YouTube have alarmed many in the public health community, with some of the more popular pro-smoking videos garnering over 10 million views. To date, research has mostly focused on analyzing the content of pro-smoking videos. Yet, little has been known regarding who is watching these videos and whether these videos have any negative effects on youth, especially those at risk of smoking. This dissertation aimed to fill this gap – without knowing the audience and effectiveness of pro-smoking videos, it is not possible to know whether the presence of these videos alone is problematic.

This dissertation first attempted to answer the question of who it is that is viewing pro-smoking videos through a selective exposure experiment. During a time-restricted browsing session, participants selected and viewed video(s) of their choice out of a set of 16 videos (eight smoking videos and eight non-smoking videos). Results based on behavioral data demonstrated that youth with higher interest in smoking were more likely to select and spend more time watching pro-smoking videos than were youth with lower interest in smoking. A secondary but nevertheless important finding of the first study was that when given the impression that smoking videos were popular (i.e., exposure to high view count smoking videos), participants held more positive attitudes toward smoking. Next, to answer the question regarding the effectiveness of pro-smoking videos, the second study analyzed post-exposure data collected as part of the selective exposure study. Correlational results indicated that there was a significant positive association

between selection of pro-smoking videos and smoking-related outcomes such as norms and attitudes. Youth with high interest in smoking also had more positive reactions to pro-smoking videos compared with their less interested counterparts. However, due to the limits of the data at hand, directionality of effects could not be established. Therefore, a third experimental study was conducted to see if there were any direct effects of exposure to pro-smoking videos on smoking-related outcomes for at-risk youth. Contrary to expectations, there was no evidence that exposure to pro-smoking videos negatively impacted smoking-related outcomes. Thus, there was no need for an intervention to correct or inoculate against pro-smoking videos. The details of the originally proposed study of using anti-smoking public service announcements as YouTube in-video advertisements to debunk misleading information contained in pro-smoking videos are provided in Appendix J for anyone interested in conducting such a study.

General Discussion

Selection and Persuasion

While exposure is a necessary condition for persuasion to occur, and is therefore one of the first steps in McGuire's (1968) model of the persuasion process, selection does not necessarily guarantee persuasion. Moreover, the step from selection to persuasion may be much further removed in the new media environment where individuals are constantly faced with a myriad of options to choose from.

Due to the vast amount of information available online and uncertainty in content quality (Sundar, 2008), selections may be based on other attention-grabbing factors that may not necessarily be associated with persuasiveness. For instance, a study in a different domain of NYTimes.com health news articles also found no support for the selection-

persuasion link: Persuasive articles were not necessarily more likely to be selected than those of lesser persuasiveness (Bae, Kim, Maloney, & Cappella, 2014).

In the context of YouTube, a study of 37 million videos found that selection had little to do with average rating of the videos, which can plausibly be viewed as a surrogate measure of the videos' message quality or argument strength (Chatzopoulou, Cheng, & Faloutsos, 2010). More surprisingly, a study of consumer goods advertisements on YouTube found that there was actually a trade-off between number of views and ad persuasiveness (i.e., purchase intent): In fact, relative persuasiveness was 10% lower for every one million views that the video ad received (Tucker, 2015). Additionally, examining the ads that had this negative relationship revealed that these videos were more likely to be rated as being "outrageous." Consistent with these empirical findings, advertising literature contends that while arousing, emotional ads can be successful in capturing attention, such strong emotions can distract from the central message, resulting in a drop-off in persuasion (Tellis, 2004). By way of illustration, several studies on the use of sexual imagery in advertisements found that while such suggestive ads succeeded in gaining attention, they failed in bringing about brand recall (Alexander & Judd, 1978; Lachance, Lubitz, & Chestnut, 1977; Steadman, 1969).

This dissertation also found lack of evidence for the selection-persuasion link. While our target population of youth interested smoking was more likely to *selectively expose* themselves to and pay more *attention* to pro-smoking videos (Study 1), there was no evidence of *acceptance* or *persuasion* (Study 3). Nevertheless, in line with the findings of Tucker (2015), videos evaluations indicate that at-risk youth were "disgusted" by the pro-smoking videos they viewed (Study 3). Additional analysis suggests that pro-

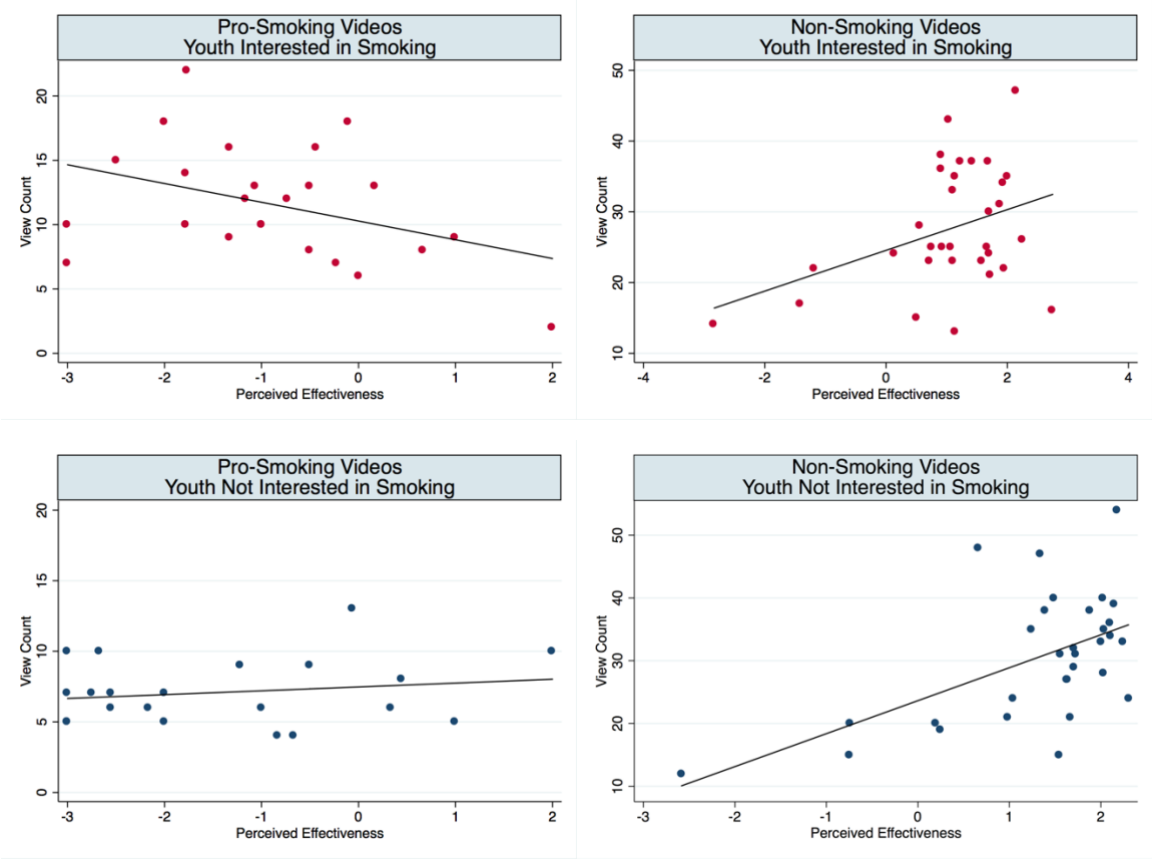
smoking videos elicit more feelings of disgust compared with that of other non-smoking videos.[5] Therefore, it could be that outrageousness or high arousal value of pro-smoking videos leads to selection by at-risk youth (who also happen to be high in sensation seeking) but distracts from actual persuasion because the actual content of the videos is too sensational and thus lacks credibility.

To further examine the relationship between persuasiveness and selection, an exploratory analysis was conducted using data collected from the selective exposure study (Study 1). First, perceived effectiveness (PE) scores were aggregated per video among target populations of interest who were exposed to the same videos (i.e., separate PE scores per video were obtained for youth interested in smoking and youth not interested in smoking respectively). Second, the total number of times each video was selected by each group were used as proxies for selection. At the video-level, in the case of non-smoking control videos, there was a significant positive relationship between PE and selection by both youth interested in smoking and youth not interested in smoking. Interestingly, for pro-smoking videos, this pattern was flipped, but only for youth interested in smoking. Although marginally significant, more persuasive pro-smoking videos were *less* likely to be selected (r = -.39, p = .060). While the data is limited in that evaluations may not have been stable and the negative persuasiveness-selection relationship for pro-smoking videos by at-risk youth was only marginally significant, it is

[5] Note that comparisons in evaluations between pro-smoking videos and non-smoking control videos are based on the post-exposure data collected as part of the selective exposure study. This data is somewhat limited because there were not that many evaluations per video to ensure stable evaluations. (This is because participants were only asked to evaluate the top two videos they viewed.) On average, there were about 10 evaluations per video. This comparison cannot be made with data from Study 3 because Study 3 did not collect evaluations of non-smoking videos.

still interesting to see that this relationship can be different based on context and personal relevance. In this study, pro-smoking videos that youth interested in smoking thought of as being persuasive tended to be less selected by members of the group, while this was not the case for non-smoking videos. This post hoc analysis suggests that there may indeed be a trade-off between persuasiveness and selection, at least in some instances. For more details, refer to Figure V-1 and Table V-1.

Figure V-1. PE-Selection Relationship by Video Type and Interest in Smoking



Note. Video-level analysis with N = 24 videos. IV = Aggregated PE scores per video by each group; DV = Total number of views per video by each group. Table V-1 summarizes the results.

Table V-1. Aggregate PE, View Count, and their Relationship

	Video type					
	Pro-smoking videos (N = 24)			Non-smoking videos (N = 32)		
	Aggregate PE	View count	Relationship	Aggregate PE	View count	Relationship
Youth interested in smoking	–0.89 (1.21)	11.58 (4.51)	***r* = –.39**$^{+}$ ***p* = .060**	1.07 (1.12)	27.63 (8.58)	***r* = .38*** ***p* = .034**
Youth not interested in smoking	–1.39 (1.50)	6.67 (2.55)	r = .17 p = .449	1.31 (1.07)	29.84 (10.65)	***r* = .56**** ***p* = .001**

Note. Video-level analysis with N = 24 videos. See Figure V-1 for a graphical depiction of relationships.

An alternative account is that pro-smoking videos are effective for those who select/seek out these videos but not so much when for those who are forced exposure. This could be why there were inconsistencies in the results of Study 2 – which is the former case that found a significant association between exposure to pro-smoking videos and smoking-related outcomes – and Study 3 – which is the latter case that found no effects of exposure. As such, selective exposure or exposure by choice may be a necessary (albeit not sufficient) condition for persuasion.

Future research should examine if there is a trade-off between selection and persuasion in certain contexts, especially in online exposure to pro-health or anti-health messages, and/or if there are boundary conditions such as personality traits, motivational states, cognitive elaboration, social influence, or repeated exposure in order for selection to lead to actual persuasion. Questions of selective exposure and persuasion are not new in communication research, but in the new media environment, there are more aspects that need to be taken into account.

Other Key Considerations

Do the insignificant results of Study 3 mean that health practitioners no longer have to worry about the prevalence of pro-smoking videos online? While short-term exposure to pro-smoking videos alone did not result in any negative smoking outcomes, there are other factors that the present dissertation did not take into account, that may have an impact on the actual effectiveness of pro-smoking YouTube videos.

Social Influence

Research identifies an innate human need to conform and to belong as one of the psychological mechanisms behind social influence (e.g., Asch, 1956; Cialdini, 2003; Cialdini & Goldstein, 2004): "people tend to do what is socially approved as well as what is popular" (Cialdini, 2003, p. 105). Interestingly, even when people are in an online setting where their behaviors are not being directly watched or evaluated by others, these motivations seem to still be present.

Another incentive to conform could be based on more practical reasons. Often times, decision making is a costly and time-consuming process such that relying on the information of others could be a useful shortcut to make a quick judgment (Chaiken, 1987). Especially, in the face of uncertainty, others' behaviors and actions can convey information about the value of adoption (Bikhchandani, Hirshleifer, & Welch, 1998). This uncertainty in today's new media environment is well noted by Sundar (2008):

> The digital media universe thus presents a dual challenge: (1) the overload of information, entertainment, and other offerings that constantly need organizing and (2) the lack of assurance of any uniformity in content quality, which necessitates a continual monitoring of credibility on the part of users. (p. 77)

With user-generated videos, social influence may come from two sources: (a) the people who post and star in the videos, who are "like them," with whom viewers can potentially identify with; and (b) social endorsements that indicate how the video is being evaluated by others.

Social endorsements. Social endorsements are possibly the most prominent and convenient indicators of social influence online. The influence of social endorsements on selection has been well-documented in empirical studies of news selection (e.g., H. S. Kim, 2015; Knobloch-Westerwick, Dillman Carpentier, et al., 2005; Knobloch-Westerwick, Sharma, et al., 2005; Sundar & Nass, 2001; Winter et al., 2016), with a study by Messing and Westwood (2012) exemplifying this point by showing that the number of recommendations an article receives can dominate partisan source cues in terms of predicting selection. This bandwagon effect (Sundar & Nass, 2001) was similarly found in other domains such as in the selection of online video clips (Fu, 2012) or songs (Salganik et al., 2006), with the effect being heightened when the endorsements were presented more prominently (e.g., descending order of popularity; Salganik et al., 2006).

There is reason to believe that social endorsements can go beyond inviting selections and have an effect on persuasion as well. For example, research has shown that online social feedback can potentially lead individuals to make incorrect and even unsafe health-related decisions (Lau & Coiera, 2008; Lau, Kwok, & Coiera, 2011). Recall the secondary findings of Study 1 that manipulation of view count to create the impression that smoking videos are popular resulted in more positive attitudes toward smoking. Also, online comments (both their presence alone and their valence) have been found to affect perceived effectiveness evaluations of YouTube videos (Shi et al., 2014). In the literature,

social endorsements are considered shortcuts for source credibility or information quality (see Sundar & Nass, 2001; Westerman, Spence, & Van Der Heide, 2012). Therefore, based on the evaluations of others, individuals' judgements of the videos and consequently their reactions to the videos could be impacted.

While Study 3 failed in illustrating the effectiveness of pro-smoking videos, the study examined the isolated video alone. Hence, the potential harm that can be caused by pro-smoking videos should not be easily dismissed based on the results of our controlled study that examined pro-smoking videos without presenting any external information available in the real world of YouTube. Concern regarding pro-smoking videos, especially popular ones (in terms of number of views, likes, valence of comments, etc.), should still remain as there is room for social persuasion. Also, because in some instances a loud minority opinion can lead to distortions in normative perceptions, swaying the opinions of others (e.g., David et al., 2006), lesser viewed pro-smoking videos should also not be written off.

YouTuber characteristics. Studies of user-generated videos on YouTube found that recency of updates, quantity of posts, in conjunction to social endorsement cues (number of views, likes, and comments), affected perceived credibility of YouTubers, which, in turn, positively affected user attitudes toward the message (Mir & Rehman, 2013; Westerman et al., 2014).

Aside from quantifiable characteristics that influence the credibility of YouTubers, YouTube is unique in that individuals *subscribe* to content creators so that they get notifications of the YouTuber's uploads and activities. Therefore, having a subscriber-YouTuber relationship ensures selection, to an extent. But in addition to that,

YouTube personalities are sometimes considered as being akin to celebrities or stars, with whom viewers form parasocial relationships with (Ferchaud, Grzeslo, Orme, & LaGroue, 2018). A *parasocial relationship* is a one-way relationship in which audience members feel like they personally know and are actual friends with a remote media persona (Horton & Richard Wohl, 1956; Rubin, Perse, & Powell, 1985). Under the illusion that they have a two-way relationship, viewers may be more receptive to recommendations made by YouTubers that they regularly watch or subscribe to. Along these lines, a study of fashion video bloggers (i.e., vloggers) found that homophily (perceived similarity) with or social attractiveness of a YouTuber leads to increased parasocial interactions, which positively affected luxury brand perceptions as well as purchase intentions (Lee & Watkins, 2016). Relatedly, homophily was found to be an important predictor of persuasiveness in the context of pro-social messages on YouTube. Specifically, public service announcements posted by similar peers were more persuasive to youth compared with those posted by an expert, especially among low-involved viewers (Paek et al., 2011). According to a meta-analysis assessing the credibility of user-generated online health information, users seem to have expectations of homophily when searching for health information in more participatory media – hence, gravitating towards lay person-generated content (Ma & Atkin, 2017).

Since this dissertation did not present much information about the YouTuber other than his or her username, there was little information on which to base judgements. In the real word, it is easier to gain more information about the YouTuber whose video you are viewing to help decide whether he or she is credible or likeable enough to trust. Maybe it is unrealistic to expect individuals to be persuaded by watching a single video

that a random person made and uploaded on the Internet without being presented with any information other than the video itself, the title, and the username of the uploader. While this method allowed a clean assessment of pro-smoking videos' effectiveness, there are other external factors that can influence perceptions of credibility that this dissertation largely ignored.

As such, smoking YouTube channels that are actively maintained and have a sizable number of subscribers have potential to be persuasive to YouTube users who encounter their videos. It is also probable that pro-smoking videos posted on such popular channels are especially persuasive or effective to their population base (i.e., subscribers) who have parasocial relationships with the YouTuber. For example, one of the more popular YouTubers whose video was featured in this study has three channels that review cigarettes, with a total combined number of over 123,000 subscribers and a total number of views over 25 million and counting.

Potential Long-Term Effects: Reinforcing Spirals

Early theories of communication such as cultivation theory are based on the premise that the content of media one is exposed to impacts one's conception of reality (Gerbner, Gross, Morgan, Signorielli, & Shanahan, 2002). More recent approaches such as the *reinforcing spirals model* similarly acknowledges the influence of one's media surroundings, yet departs from cultivation theory by its emphasis of selective exposure and individual predilections (Slater, 2007). According to Slater (2007), "media selectivity and media effects form a reciprocal, mutually influencing process" (p. 283). Under this framework, individuals who are high in sensation seeking or have higher levels of interest in smoking would be more likely to view pro-smoking videos and also be subsequently

impacted by these videos such that over time, this mutually reinforcing process strengthens individual attitudes or behaviors related to smoking.

Therefore, while the dissertation failed to find short-term effects for pro-smoking videos, it could be that these videos have effects, but over longer periods of time. In line with this model, there is a possibility that individual predilections and exposure to pro-smoking videos mutually reinforce one another which ultimately pushes youth who are interested in smoking to engage in smoking behavior, similar to what was found in Study 1. In platforms like YouTube, there are even more opportunities for reinforcing spirals due to, for instance, the number of views or likes that the video in question received, recommendations based on YouTube algorithms that show similar videos to the videos that were watched by the individual, comments by other users that reaffirm individual beliefs, new videos uploaded by the same YouTuber that contain similar arguments, and so forth.

Given studies that show that repeated exposure can have effects over time due to mere familiarity effects (e.g., Begg et al., 1992; Weaver et al., 2007), there is an even greater possibility that pro-smoking videos will be effective to at-risk youth in the long-run due to (a) individual predilections; (b) interest in pro-smoking materials (results of Study 1); (c) reinforcement of (a) and (b); and (d) features of YouTube that make this process more convenient.

Diffusion: Viral Nature of Misinformation

The body of work on what is more likely to be shared or retransmitted has been growing with Web 2.0 developments. Empirical studies of sharing have identified certain message characteristics like emotional evocativeness, informational utility, and novelty to

be associated with diffusion of online news articles as well as anti-smoking arguments (see Berger & Milkman, 2012; H. S. Kim, 2015; H. S. Kim, Lee, Cappella, Vera, & Emery, 2013; Thorson, 2016 for examples). Novel and arousal-inducing content has long been associated with social transmission in the sharing of urban legends, rumors, and gossip (Berger, 2011; Heath, Bell, & Sternberg, 2001; Peters, Kashima, & Clark, 2009). Novel content is attention-grabbing and people tend to converse more about provocative topics in an attempt to better understand and interpret what they mean. Counterintuitive and arousing content is likely to be entertaining and of interest to others as well, in that sharing such content can bring about positive recognition from others and fulfil self-enhancement motives (Berger & Milkman, 2012; Hennig-Thurau, Gwinner, Walsh, & Gremler, 2004; Sundaram, Mitra, & Webster, 1998).

In line with these findings, a recent study of the diffusion of misinformation on Twitter by Vosoughi and colleagues (2018) found that false news spreads "significantly farther, faster, deeper and more broadly than the truth in all categories of information" compared with true news (Vosoughi, Roy, & Aral, 2018, p. 1147). The authors attributed the differences in diffusion dynamics to the novel nature of false news. False news was more novel than true news and was more likely to bring about emotional responses such as disgust, fear, and surprise (compared with responses of sadness, joy, anticipation, and trust to true news; Vosoughi et al., 2018).

Pro-smoking videos that were studied in this dissertation were also found to elicit stronger negative emotions such as disgust, and therefore can have more potential to go viral. The qualities and characteristics of misinformation actually appear to lend to its virality. Even if the effectiveness of the information that is being diffused is unknown or

questionable, sharing can produce effects by implying credibility. In addition, diffusion has the power to greatly increase exposures, which, in itself, can be problematic.

Implications

The findings of this dissertation provide some policy implications regarding regulation of smoking promotion videos online. While Google already has regulations against advertising tobacco products (Google, 2017), smoking content in user-generated videos remain largely unregulated. Although it is true that most pro-smoking user-generated videos can serve as endorsements of cigarette smoking and of certain cigarette brands, these videos cannot be prosecuted under the Cigarette Labeling and Advertising Act because they do not fall under "commercial speech" and are thus protected under the First Amendment (Ciolli, 2007).

While the potential harm of pro-smoking videos is debatable, at the very minimum, these videos should be age-restricted so that they are not visible to at-risk youth, who we find are most attracted to these videos. Despite YouTube policy that "portrayal of harmful or dangerous activities" falls under age-restricted content (YouTube, 2017), an earlier study found that 85% of smoking fetish videos were not age-restricted on YouTube (K. Kim et al., 2010). Tobacco control advocates could call for stricter self-regulation by YouTube and also contribute to reporting problematic videos. Another suggestion is to incorporate more anti-smoking messaging in this platform – for instance, in the form of YouTube advertisements or in the form of comments – such that individuals who click on pro-smoking content would be able to make a more informed decision. All in all, because of (a) pro-smoking videos' prevalence on YouTube (e.g., Forsyth & Malone, 2010; Freeman & Chapman, 2007; K. Kim et al., 2010); (b) the young

and at-risk nature of the individuals who view them; (c) their ability to affect smoking-related attitudes when they appear popular; and (d) the viral nature of misinformation (Vosoughi et al., 2018) more regulatory effort is indeed called for.

Future Directions

Suggestions for future research are made in light of the limitations of this dissertation. For example, a selective exposure study similar to Study 1 could be conducted using different proportions of pro-smoking and non-smoking videos to see if exposure patterns are affected, and if so, to what extent. This could determine how much exposure is contingent on availability of pro-smoking materials on YouTube. In addition, future studies should consider measuring outcomes both pre- and post-exposure to see if there are changes based on selective exposure. While measuring outcomes twice may alert participants to the purpose of the study and heighten experimenter demand, because "selective exposure cannot be experimentally manipulated," this may be the best method to assess the true effect of selective exposure (and not forced exposure) to pro-smoking videos (Knobloch-Westerwick, 2012, p. 639).

It would also be interesting to examine the question of whether there is a trade-off between selection and persuasion, at least in some contexts such as the selection of pro-smoking materials by at-risk youth. For instance, a study could be conducted with messages with varying levels of perceived effectiveness to see if selection has a negative relationship with perceived effectiveness. Another way to approach this question is to obtain evaluations or ratings of the messages of interest to compare the content features of messages that are selected more and content features of messages that are more persuasive to see if the two differ. There may be certain conditions this relationship is

dependent upon such as individual predilections or motivations that should also be considered.

Another suggestion is to include other social endorsement features available on YouTube such as comments, likes, or number of subscribers to see how viewing patterns and effectiveness of video exposure are affected based on introduction of more information, as in the real world. The effect of social endorsements on selection has been well-established in the literature, but the question of whether endorsements affect actual persuasion (other than luxury brand purchase intentions) remains to be studied. In addition, how YouTuber-viewer relationships impact persuasiveness is also a question that could be examined. Instead of sampling random populations, it could be of interest to sample the subscribers of a certain problematic YouTube channel to see whether there are changes in attitudes or behaviors based on the recommendations or actions by the YouTuber, depending on the amount of exposure and the strength of the parasocial relationship.

Naturally, this leads to the next suggestion which is to conduct a longitudinal study on the effectiveness of pro-smoking videos. In particular, it would be interesting to see if platform features of YouTube encourage reinforcing spirals. To elaborate, the algorithm of YouTube recommends videos based on previous selections, which creates an environment that is conducive to be exposed to similar points of views. Since this dissertation found that individual predilections lead to exposure to pro-smoking videos and that view count affects attitudes toward smoking, other YouTube features such as video recommendations, online comments, and social endorsements, can serve to strengthen mutual reinforcement of media use and attitudinal/behavioral effects over

time. This could further our understanding of whether certain media technologies can intensify the influence of spirals.

Lastly, a more general suggestion is to study whether YouTube videos, and more specifically, health information on YouTube is perceived as being credible. While health practitioners have successfully used YouTube for disseminating critical health information during a national public health crisis (e.g., Walton, Seitz, & Ragsdale, 2012), whether health-related information on YouTube is perceived as being credible is a question that still has not been answered yet. Before health practitioners utilize platforms like YouTube to disseminate health information, the credibility of health-related information on YouTube needs to be more extensively studied.

Conclusion

The current dissertation contributes to our understanding of pro-smoking content in the new media environment by delving into the audience characteristics and potential effectiveness of smoking promotion YouTube videos. With Web 2.0 developments, there have been increasing concerns regarding widening availability of misinformation online and what needs to be done to combat this problem. Taking a step forward from existing literature that probes into the content and availability of misleading health-related information on YouTube, this dissertation documented that at-risk youth were the primary audience of misleading information, at least in the context of pro-smoking videos. While the credibility and effectiveness of misinformation (or misleading information) online appear to be questionable, there is still more research to be done to better understand the potential harm misleading online content may have on individuals' health-related behaviors as there may be other routes to persuasion.

APPENDICES

Appendix A. Stimulus Material (Study 1)

This table presents details regarding YouTube videos that were used in Study 1.

YouTube title by originator	Thumbnail image	Length (in sec.)	Views
Social Acceptance Smoking Videos (Category A)			
How To Smoke a Cigarette by Drew Verdrame		116	18,633
Justin Bieber Sexy Schoolgirls Smoking 360p by istván nagy		224	87,017
Hollywood/Celebs Smokers by JolyTracyLynOfficial		83	184,408
Supermodels Smoking by superninanova		259	62,866
Pete Firman's Illegal Smoking Trick by ToNiBuM77		299	201,250
KC smokes a whole cigarette in record time by Will Presley		97	180,380
man smokes a whole cigarette in one drag by Finallyitshere		157	2,007,722
1 cigarette 1 drag by Jorge Murillo		103	10,493,239

Tutorial Smoking Videos (Category B)			
How to Hide smoking & the smell by PugPrincessBro		290	170,386
How to Buy Smokes Under-Age - (63) Days of Summer by A Daily Summer Vlog		164	64,230
How To Look As Cool As Possible. (While smoking a cigarette) by Wrenaux Stewart		298	8,650
How to smoke a cigarette (like a lady) by IAmMeAndNoOneKnows		300	180,834
How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) by swordfish3r's channel		224	223,923
How to smoke a cigarette! by Richard McDonald		240	271,791
How to Smoke A Cigarette 2012 Spencer Hall by Spencer Hall		127	28,719
Remove FSC Chemical From Your Cigarettes by clee1217		300	115,342
Testimonial Smoking Videos (Category C)			
Marlboro Red - Q&A with DansCigReview by DansCigReview		294	51,545

My Cigarette Story by BakedUp		300	74,211
smoking a cigarette q&a by utubesmokers		300	66,180
Warning Labels on Tobacco Products - RANT by HaveASmokeAndRelax		299	81,021
SMOKING IS COOL! by MrJIMMYPIMPS		224	40,029
SMOKING IS COOL. by The Amazing Atheist		294	208,785
Smoking is good for you! Rant. by johnantinarelli		104	51,520
The Pros of Smoking Cigarettes by Spa Week		110	29,146
Antismoking Videos (Category D)			
5 Weird Reasons Not to Smoke by SciShow		150	1,369,355
How To Quit Smoking by Howcast		178	463,310
Don't Smoke by JLE		98	419,611

Quit Smoking Prank! by VitalyzdTv		53	6,078,977
My Quitting Smoking Story by Kaylee Kapital		299	22,853
5 Best Tips to Quit Smoking Now and Forever by LunarWyne		174	70,495
My Boyfriend Smokes & I Hate Smoking - Sexy Times With Gurl by Gurl.com		183	13,866
2 years after quitting smoking by SciShow		298	44,796
Social Acceptance Control Videos (Category E)			
Random Girl in the mall blows everyone away at the karaokemachine singing Whitney Houston by Yedi Mind		285	25,302,111
How to get more followers on Instagram (without follow for follow) by ChaseRowell		129	575,877
BEST CLASSROOM APRIL FOOLS PRANK EVER by Josh W		278	47,274,402
Cutest Promposal Ever! Pella High School Senior Boys Dance to One Direction! by Madeline Meyer		144	112,438

“Burritozilla” killed in under 2 Minutes! by Matt Stonie		265	3,470,542
Suns Fan Hits $77,777 Halfcourt Shot! by Suns		120	594,597
How to Flirt With A Guy Thru Text by Frank Legend’		300	22,324
Sweet 16 Court Dance + Father & Daughter Battle by Maria Santucci		300	53,653
Tutorial Control Videos (Category F)			
10 HOUSEHOLD PRANKS - HOW TO PRANK by howtoPRANKitup		286	8,594,612
How to screen print your own t-shirts by I Like To Make Stuff		300	728,754
My Study Tips & Tricks! + How to Stay Organized! by emmacatherine09		297	101,663
How to make your pc/laptop run faster (3 simple steps) by Ramcubed		201	2,692,706
How to Solve the Rubik’s Cube! (Beginner Method) by techtopia		295	4,732,868
How to Pack a Carry-On in 5 Minutes or Less by MissJessicaHarlow		239	83,479

How I Edit Minimal Instagram Photos by Drew Scott		300	158,546
How to Use Chopsticks Tutorial by emmymadeinjapan		267	66,068
Testimonial Control Videos (Category G)			
Meditation | My personal experience and routine by Anastasjia Louise		300	61,808
Working at Starbucks by fashionwithpassion		296	43,903
MY JOURNEY THROUGH MEDICAL SCHOOL | #4 Medical School Series | AdannaDavid by AdannaDavid		297	44,910
Studying Abroad: My Experience + Photos! by TheGridMonster		300	205,610
♡ My Homeschool Experience ♡ | My Whole Life by TheBeautyWithinYou | Jordan Anne		298	67,918
MY COMING OUT STORY! by JoeyGraceffa		297	468,986
My Experience Traveling Alone | Lana by Lana		297	34,747

MOVING OUT OF HOME FOR THE FIRST TIME! My Advice by BRITTNEYLEESAUNDERS		297	78,858
Risky Behavior Videos (Category H)			
Legal			
Epic Bungee Jumping in the California Wilderness!! by Cool Coconut Studios		190	14,884
Laie Point Cliff Jumping- Nectar by Nainoa Langer		183	19,047
Top 20 Most Dangerous Stunts in world by laughspark		271	337,426
Bungy Jumping Party! Behind The Scenes in New Zealand! by devingraham		297	518,463
Illegal			
Girls Getting Drunk by PrestigeWorldwide		165	23,793
Teenage girls getting drunk in the park by BijouBaxterBaby		64	16,368
Drunk teens by Kingkelv9's channel		153	9,557
FIRST TIME EATING WEED COOKIES!!! by Alyssa Moore		296	844

Appendix B. Video Classifications based on Misinformation (Study 1)

Based on the propositions of the videos – both the implicit/explicit claims being made in the video and the visuals – the 24 smoking promotion videos were classified into the following classifications based on degree of misinformation:

Classification	Explanation
High risk	Videos that are pro-smoking that we suspect promote pluralistic ignorance about either the prevalence (descriptive norm) or acceptability (injunctive norm) of youth smoking. These messages are implicit forms of misinformation because they generally portray smoking in a positive light, conveying social acceptability of smoking, as well as affect perceptions of a pro-smoking descriptive norm. About 8.0% of high school students reported to have smoked a cigarette in the past 30 days in 2016, which is a decline from 15.8% in 2011 (according to CDC's "Youth and Tobacco Use"). The low percentage and the fact that it is in decline suggest that the descriptive and injunctive norm for youth smoking is actually not that positive.
Misleading	Videos that contain misleading implicit or explicit claims related to an aspect of smoking. Examples include false equivalencies, such as equating the risks of smoking to the risks of dying in a car accident, or a man making the implicit claim that there are healthy aspects to smoking by telling a story about how he was sick until he started smoking and he got better once he started smoking. The latter is not classified as "inaccurate" because the speaker is only talking about his own perceptions, but it is considered "misleading" because smoking cigarettes does not make one healthier.
Inaccurate	Videos that contain explicit, inaccurate information (i.e., misinformation) related to an aspect of smoking.

The table below lists the premise and classification for each video.

Video title	Classification and premise
Social Acceptance Smoking Videos	
How To Smoke a Cigarette	*High risk* - This video is high risk because it is a compilation of different types of young people smoking, which implies that smoking is normative.

Justin Bieber Sexy Schoolgirls Smoking 360p	*High risk* - This video is high risk because it shows schoolgirls (who are most likely underage and look underage) smoking together, which conveys social acceptability or social identification with risky behavior.
Hollywood/Celebs Smokers	*High risk* - This video is high risk because it is a compilation of different celebrities smoking, which may imply that smoking is socially desirable. This video may be problematic because a lot of adolescents identify with celebrities.
Supermodels Smoking	*High risk* - This video is high risk because it shows supermodels smoking, which implies that smoking is socially desirable – it links smoking and attractiveness.
Pete Firman's Illegal Smoking Trick	*High risk* - This video shows a young man performing smoking tricks (eating cigarettes, smoking multiple cigarettes at once, etc.) as part of a comedy routine and is high risk because his smoking behavior is rewarded by an audience that laughs and applauds.
KC smokes a whole cigarette in record time	*High risk* - This video is high risk. A man tries to smoke a cigarette in "record time" in front of a group of friends – a friend comments that this is going to make him famous. Social approval is apparent from the anticipation and cheering of his friends. In the end, the smoker shouts "Awesome! Philip Morris!"
man smokes a whole cigarette in one drag	*High risk* - This video is high risk because it shows a man trying to smoke a cigarette in one drag in front of his friends. From his friends' reactions (asking whether this has been ever done before, etc.), social approval is apparent.
1 cigarette 1 drag	*High risk* - This video shows a young man who smokes 1 cigarette in 1 drag surrounded by friends who cheer him on ("that's a real champ right there," "that's my boy"). This video is high risk because it conveys social acceptability of smoking.
Tutorial Smoking Videos	
How to Hide smoking & the smell	*High risk* - This video tells you how to hide the smoke and smell from your parents. Although the girl in this video is 18 (and of legal age), this video may be high risk because it provides information for younger smokers who do not want to get caught by their parents. She also makes a misleading claim that your breath will smell less like smoke if you breathe it out your nose.
How to Buy Smokes Under-Age - (63) Days of Summer	*Misleading* - This video shows two teenage boys buying cigarettes underage from a store. The video encourages smoking as a form of rebellion and is misleading because it gives you tips to buy cigarettes underage which makes it seem like you can buy cigarettes underage easily.

How To Look As Cool As Possible. (While smoking a cigarette)	*High risk* - In this video, a young teenager shows how to look cool when smoking while making fun of others. This video is high risk because it directly references looking cool while smoking. For instance, she tells women to learn how to French inhale: "You're looking hotter already. Now that you're super cool, you might want to engage in conversations with others who are looking at you and admiring your coolness."
How to smoke a cigarette (like a lady)	*High risk* - In this video, a young woman explains how to smoke and look classy and lady-like while doing so (e.g., teaches you how to hold the cigarette and how not to look like a "noob"). This video is high risk because she is directly referencing looking like a lady which seems like a social cue – making smoking look socially desirable/attractive
How To Smoke A Cigarette And Look Cool (REAL VERSION!!!)	*High risk* - In this video, a young man talks about the benefits of smoking (getting a raspy voice to sing like someone, getting extra time off work because you get more breaks, you can look cool). This video is high risk because it teaches you to inhale as much of the cigarette and hold it in as much as you can to look cool.
How to smoke a cigarette!	*Inaccurate* - The man in this video talks about how to smoke a cigarette properly "so you don't look like an idiot" and get tongue cancer. This video contains misinformation because the claim that tongue cancer is only caused by holding smoke in your mouth is inaccurate. his video teaches viewers how to smoke, recommends cigarette brands, etc. and in doing so he downplays the other risks of smoking.
How to Smoke A Cigarette 2012 Spencer Hall	*High risk* - This video is high risk because it teaches viewers how to smoke a cigarette. The man in the video tells you that you shouldn't smoke like a teenage girl ("they're not even inhaling"). He tells viewers to "Relax, breathe in, just smoke, and everything is going to be okay."
Remove FSC Chemical From Your Cigarettes	*Inaccurate* - A FSC cigarette is microwaved and its burning is compared with a non-FSC cigarette. This is misinformation in that the video argues that microwaving cigarettes gets rid of the FSC chemical (and the video makes it seem like this makes your cigarettes "healthier" because it removed a chemical).
Testimonial Smoking Videos	
Marlboro Red - Q&A with DansCigReview	*Misleading* - This video is misleading because in the video, the smoker implies that cigarettes made him healthier. Specifically, he said that after his father (who was a smoker) quit smoking, he was sick for a couple of days but being around a friend who smoked made him feel better: "He lit up a cigarette and I felt better." He also

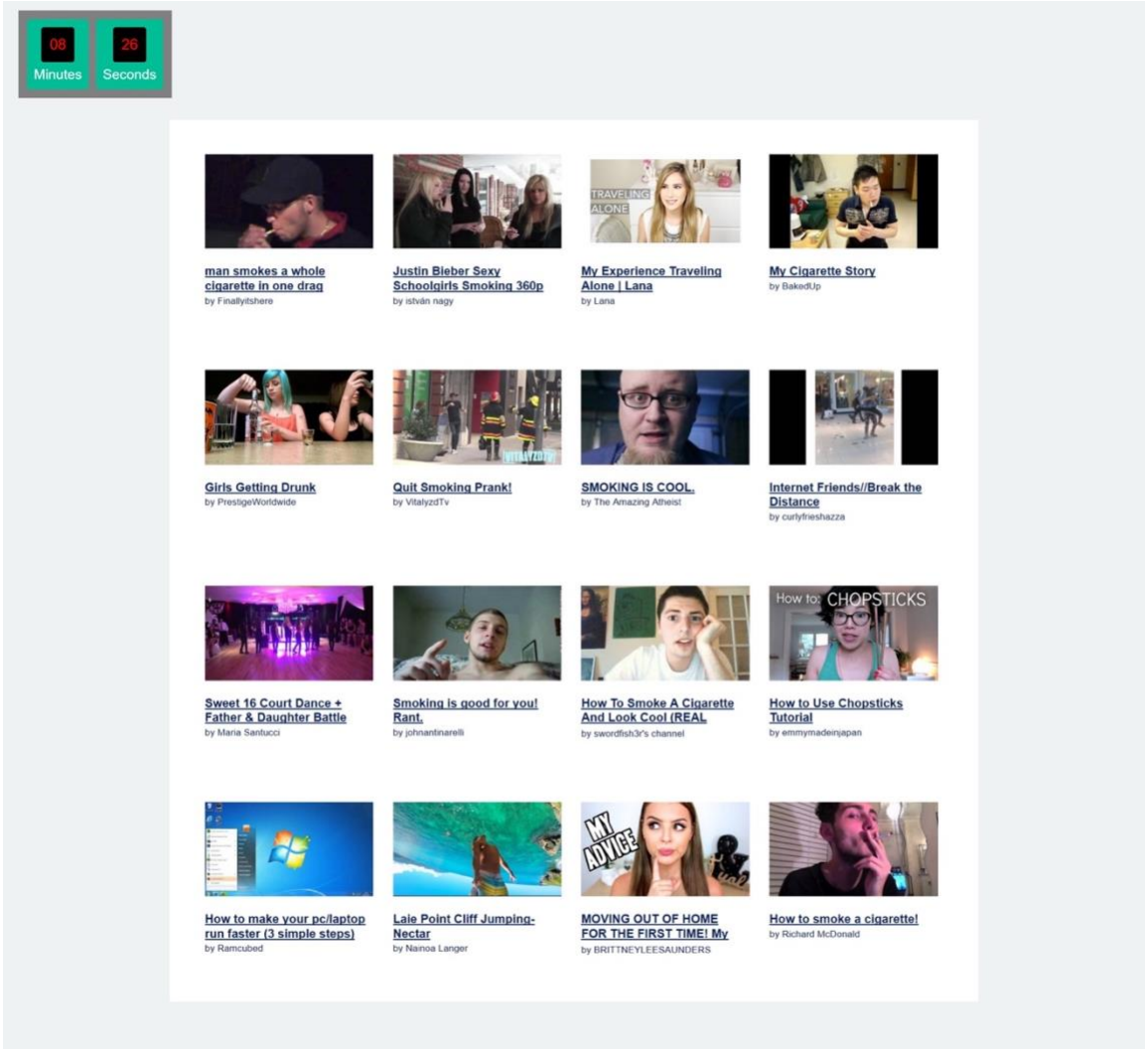
	mentions that he started smoking when 15 (underage smoking), that "It actually does help me relax, and it does help me concentrate maybe and get things back in focus."
My Cigarette Story	*Misleading* - In this video, the smoker discusses his personal experience with smoking. This video is misleading because of some claims that he makes: (1) He says that nicotine makes you happy – he says that the reason why he started smoking was because smoking reduces stress, makes feel him relaxed, etc. He "choose[s] to live a happy life…be happy"; (2) He also says that he is healthy - "Smoking does deteriorate your health, but if you are a boss, if you control your life, if you live a healthy life, you can be like me, better than me. I can run faster than most people. I can run longer than most people. And I'm healthy."
smoking a cigarette q&a	*Misleading* - This video is misleading because the smoker downplays the dangers of smoking (e.g., says that "as long as there's a burn in the back of my throat, I just feel real and alive," "there's not a whole lot that I really hate about smoking other than the fact that it's supposedly going to kill me some day, but something's going to one way or the other so I might as well have fun." She also mentions that she started smoking when 16 "because I was rebellious and I always thought it was a bad girl kind of thing to do and you know there's kind of a sexy appeal to that too."
Warning Labels on Tobacco Products - RANT	*Inaccurate* - This video is of a man complaining of cigarette pack labeling showing the health effects of smoking. This video is misleading because of the claims it makes: (1) It equates the danger of smoking to driving a car; (2) Suggests that it isn't for health reasons that cigarette companies have to have health warning labels on their packets but rather it is "a few small interests groups and a few small religious sects of the world that really despise and hate smokers"; (3) Equates a product that cures erectile dysfunction that has a small chance of causing a nose bleed to the health effects of cigarettes. The video argues that "you should have the right to make and do whatever you want."
SMOKING IS COOL!	*Misleading* - This video is misleading because the smoker says that "you're not going to die from it – it even says so on the box…MAY cause cancer MAY keyword." The video also argues that you have to smoke to be cool and if you don't you are a loser.
SMOKING IS COOL.	*Inaccurate* - This video contains misinformation because the man in the video claims he tried to become addicted to cigarettes but can't (suggesting that some people can't get addicted) and also suggests that the effects of smoking are not visible ("cigarettes will fuck your lungs up but you can't see anyone's lungs. you can smoke two packs a day and be a supermodel you can't eat two cheeseburgers and be a supermodel." The man also suggests that all governmental programs

	would collapse and the country would go broke if smokers quit because we wouldn't be able to collect taxes on them; Suggests people only pretend to dislike smoking, but then they secretly think smokers look cool.
Smoking is good for you! Rant.	*Inaccurate* - In this video, a young man rants that smoking is actually good for society. He says that smoking is a choice and that people know that it's bad but it doesn't matter "because smoking feels good." He also rants against antismoking campaigns and people who tell them not to smoke (the reason being that the government doesn't care so other people shouldn't care). This video contains misinformation because he says that you can get cancer from anything, not just from smoking: "Everybody seems to be dying from cancer. You get cancer from anything. You get cancer from drinking tap water [...] ice tea […] everything's going to give you cancer."
The Pros of Smoking Cigarettes	*Misleading* - This video is misleading because it talks about why people smoke and emphasizes the benefits of smoking (while ignoring to discuss the harms of it). The woman in the video talks about a "study" published in the *New York Times* that smokers are promoted more quickly by smoking with more senior people. Some other benefits mentioned are: (1) Smokers can meet single smokers at bars; (2) Smoking can keep you thin; (3) Smoking forces you to take a break; etc.

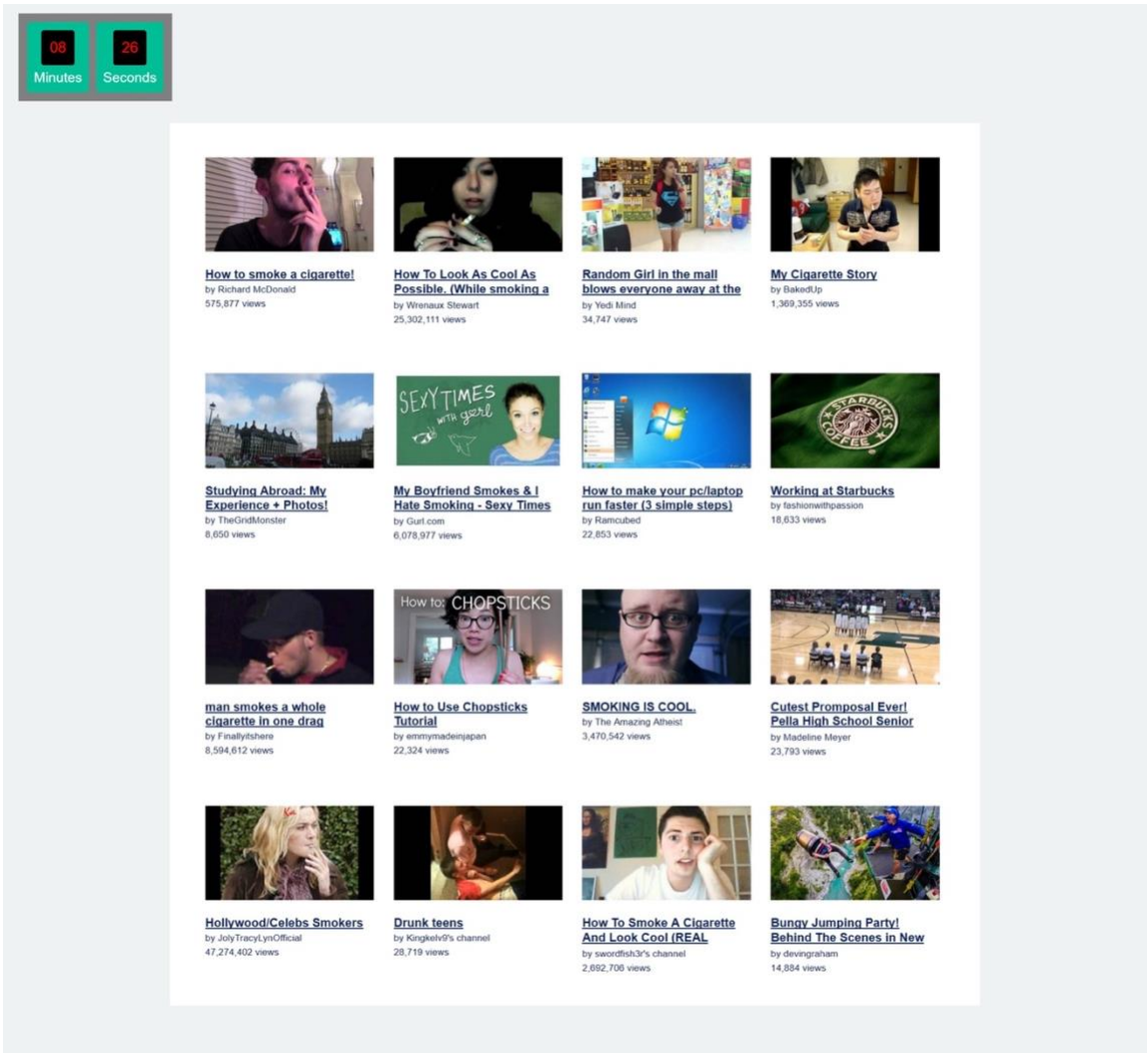
Appendix C. Screenshots of Browsing Phase (Study 1)

Browsing Screen

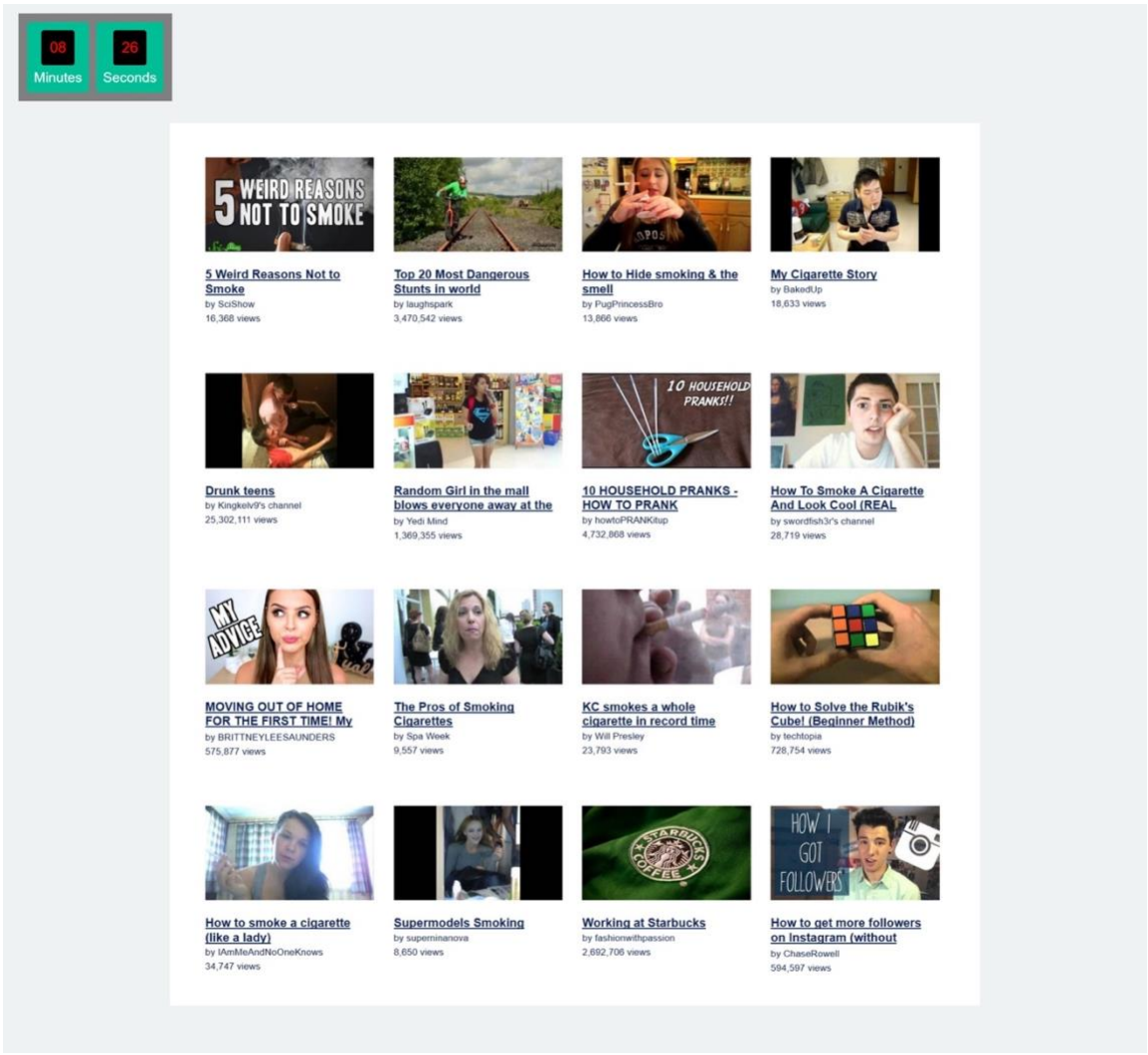
Condition 1 (*no-view-count-comparison condition*)



Condition 2 (*smoking-high-views condition*)



Condition 3 (*smoking-low-views condition*)

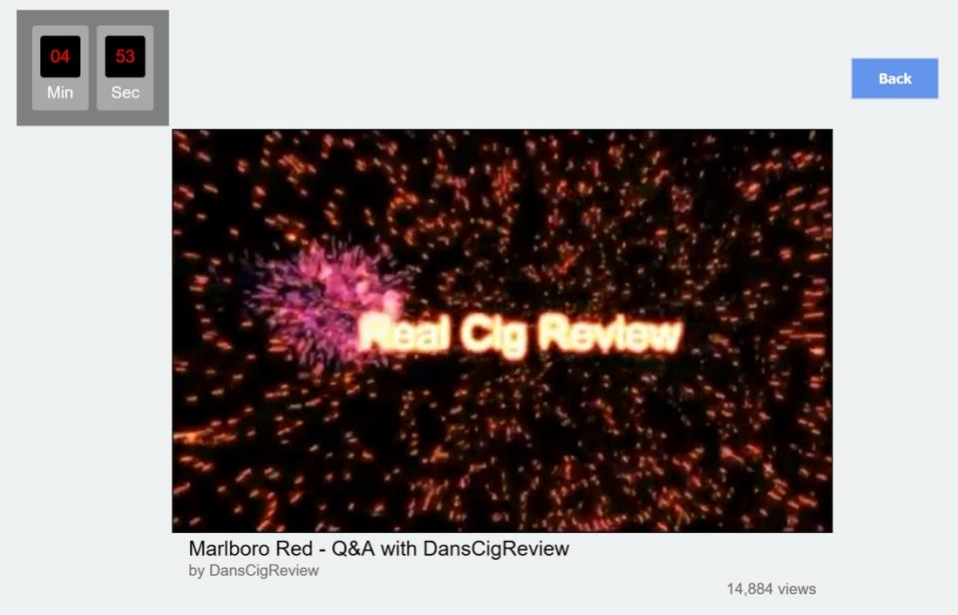


Video Screen

Condition 1 (*no-view-count-comparison condition*)

Condition 2 (*smoking-high-views condition*)

Condition 3 (*smoking-low-views condition*)



Appendix D. Regression Results for Indirect Effects of Selection on Outcomes through Video Evaluations (Study 2)

Analysis: Preacher and Hayes' (2008) PROCESS macro

- Analysis with $N = 141$ participants who evaluated pro-smoking videos (i.e., had either one or two pro-smoking video(s) as their top video)
- For respondents had two pro-smoking videos as their top videos, their positive reactions and engagement scores for the two pro-smoking videos were averaged so that the mediation analyses could be conducted at the individual level
- X variables: Pro-smoking selection (exposure time, number of selection, first selection likelihood)
- M variables: Video reactions (engagement, positive reactions)
- Y variables: Smoking-related outcomes (social norms, attitudes)

Summary: Possibly due to limited power (because this set of analyses could only be conducted with individuals who evaluated pro-smoking videos; $N = 141$), the only two significant indirect effects were:

Exposure time → Positive reactions → Norms (complete mediation)
Exposure time → Positive reactions → Attitudes (indirect effect)

The X → M relationship (*a*) was insignificant for the following pairs of variables. Therefore, there was no evidence for mediation.

X		M	*B*	*SE*	*p*
Number of selection	→	Engagement	–0.00	0.06	.989
Number of selection	→	Positive reactions	–0.09	0.07	.252
First selection likelihood	→	Engagement	0.16	0.16	.313
First selection likelihood	→	Positive reactions	0.31	0.20	.121
Exposure time	→	Engagement	0.00	0.00	.189

Exposure time (X) → Positive reactions (M) → Social norms (Y)

		Consequent						
		M (Positive reactions)				Y (Favorable norms)		
Antecedent		*B*	*SE*	*p*		*B*	*SE*	*p*
X (Exposure time)	*a*	0.00	0.00	.040	*c'*	0.00	0.00	.263
M (Positive reactions)		—	—	—	*b*	0.44	0.07	< .001
Constant	i_1	2.06	0.20	< .001	i_2	0.95	0.23	< .001
		$R^2 = 0.03$				$R^2 = 0.24$		
		$F(1, 139) = 4.29$, $p = .040$				$F(2, 138) = 21.75$, $p < .001$		

	Bootstrap results for indirect effect			
	Indirect effect	*SE*	LL 95% CI	UL 95% CI
Effect	0.0007	0.0003	0.0001	0.0014

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LL = lower limit; UL = upper limit; CI = confidence interval. $N = 141$.

Exposure time (X) → Positive reactions (M) → Attitudes (Y)

		Consequent						
		M (Positive reactions)				Y (Favorable attitudes)		
Antecedent		*B*	*SE*	*p*		*B*	*SE*	*p*
X (Exposure time)	*a*	0.00	0.00	.040	*c'*	–0.00	0.00	.378
M (Positive reactions)		—	—	—	*b*	0.77	0.10	< .001
Constant	i_1	2.06	0.20	< .001	i_2	–3.27	0.32	< .001
		$R^2 = 0.03$				$R^2 = 0.30$		
		$F(1, 139) = 4.29$, $p = .040$				$F(2, 138) = 29.05$, $p < .001$		

	Bootstrap results for indirect effect			
	Indirect effect	*SE*	LL 95% CI	UL 95% CI
Effect	0.0011	0.0006	0.0001	0.0023

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LL = lower limit; UL = upper limit; CI = confidence interval. $N = 141$.

Appendix E. Principal Component Analysis of Beliefs (Study 3)

Items	Factor loadings			
	1	2	3	4
ADDICTION				
If I smoke *every day*, I will be controlled by smoking.	–0.06	**0.72**	0.13	0.24
If I smoke *every day*, I will be unable to stop smoking when I want to.	–0.17	**0.47**	0.13	0.16
If I smoke *every day*, I will become addicted to cigarettes.	–0.01	**0.71**	0.22	0.08
PHYSICAL (HEALTH) EFFECTS				
If I smoke *every day*, I will develop sexual and/or fertility problems.	–0.04	**0.65**	0.12	0.10
If I smoke *every day*, I will be able to focus. **(R)**	**0.58**	0.24	–0.11	0.35
If I smoke *every day*, I will lose weight. **(R)**	0.29	–0.10	**–0.36**	–0.01
HARMFUL INGREDIENTS – HEALTH EFFECTS FRAMING				
If I smoke *every day*, I will develop cancer.	0.04	**0.80**	0.04	–0.03
If I smoke *every day*, I will develop inflammation in my lungs.	0.12	**0.73**	0.21	–0.17
If I smoke *every day*, I will die an early death.	0.05	**0.74**	0.27	0.00
YOUTH SUSCEPTIBILITY TO HEALTH EFFECTS				
If I smoke *every day*, I will be just as likely to damage my body as an adult smoker would.	0.02	**0.67**	0.11	–0.49
If I smoke *every day*, I am just as likely to harm my health as an older person who smokes every day.	0.02	**0.62**	0.12	–0.45
SOCIAL PERCEPTIONS (SMOKING)				
If I smoke *every day*, I will be able to show others that I'm not afraid to take risks. **(R)**	**0.75**	–0.03	–0.01	0.13
If I smoke *every day*, I will gain friends. **(R)**	**0.79**	0.02	0.10	–0.05
If I smoke *every day*, I will look mature. **(R)**	**0.80**	0.00	–0.01	–0.05
If I smoke *every day*, I will look cool. **(R)**	**0.82**	0.02	0.02	–0.11
If I smoke *every day*, I will look attractive. **(R)**	**0.84**	0.04	0.09	–0.18
MOOD EFFECTS				

If I smoke *every day*, I will feel relaxed. **(R)**	**0.62**	–0.06	–0.08	0.42
If I smoke *every day*, I will be able to forget about my problems. **(R)**	**0.76**	–0.06	0.06	0.07
If I smoke *every day*, I will feel more comfortable in social situations. **(R)**	**0.76**	0.08	–0.03	0.20
COST OF SMOKING				
If I smoke *every day*, I will spend more money on doctor and dentist visits.	–0.03	0.48	**0.50**	0.17
If I smoke *every day*, I will have less spending money.	0.02	0.20	**0.79**	–0.06
If I smoke *every day*, I will waste money I could have spent on other things.	0.16	0.38	**0.67**	–0.11
INDIVIDUAL BELIEF ITEMS (not included in any scale)				
If I smoke *every day*, I will develop a scratchy voice.	0.00	0.50	**0.53**	0.01
If I smoke *every day*, I will get more breaks. **(R)**	**0.62**	–0.04	–0.09	0.19
If I smoke *every day*, I will be just as likely to die as nonsmokers because smoking is just as dangerous as other activities like driving a car. **(R)**	**0.49**	0.04	0.00	0.38
Eigenvalues	6.05	5.79	1.16	1.05
% of variance	24.2%	23.2%	0.05%	0.04%
Number of test measures	11	9	5	0

Factor 1: **Misleading beliefs about the benefits of smoking (alpha = .91; 10 items)**

- If I smoke *every day*, I will be able to focus.
- If I smoke *every day*, I will be able to show others that I'm not afraid to take risks.
- If I smoke *every day*, I will gain friends.
- If I smoke *every day*, I will look mature.
- If I smoke *every day*, I will look cool.
- If I smoke *every day*, I will look attractive.
- If I smoke *every day*, I will feel relaxed.
- If I smoke *every day*, I will be able to forget about my problems.
- If I smoke *every day*, I will feel more comfortable in social situations.
- If I smoke *every day*, I will get more breaks.
- ~~If I smoke *every day*, I will be just as likely to die as nonsmokers because smoking is just as dangerous as other activities like driving a car.~~
    - Removed based on face validity because this is not a benefit of smoking; this item also had a relatively low factor loading < .50

Factor 2: **Correct beliefs about the health risks of smoking (alpha = .87; 9 items)**

- If I smoke *every day*, I will be controlled by smoking.
- If I smoke *every day*, I will be unable to stop smoking when I want to.
- If I smoke *every day*, I will become addicted to cigarettes.
- If I smoke *every day*, I will develop sexual and/or fertility problems.
- If I smoke *every day*, I will develop cancer.
- If I smoke *every day*, I will develop inflammation in my lungs.
- If I smoke *every day*, I will die an early death.
- If I smoke *every day*, I will be just as likely to damage my body as an adult smoker would.
- If I smoke *every day*, I am just as likely to harm my health as an older person who smokes every day.

Appendix F. Subgroup Analyses to Examine Moderation (Study 3)

Question: Are there any potential moderating effects based on subgroup characteristics?

Summary: There are no clear-cut moderating effects based on subgroup characteristics that provide an explanation for the lack of difference across conditions on smoking-related outcome variables. Even the significant results were in the opposite direction.

Smoking Interest

	Outcome Variable							
	Beliefs							
	Misleading – benefits	Correct – health risk	Social norm	Attitudes	Intentions (smoking)	Intentions (tobacco)	Self-efficacy	Ambivalence
Condition								
1 (soc-pos)	–.11 (.28)	.47^{+} (.25)	–.06 (.29)	–.29 (.46)	–.27 (.40)	–.30 (.34)	.23 (.36)	–.52 (.54)
2 (soc-neg)	–.02 (.24)	.08 (.22)	.2 (.26)	.13 (.41)	.05 (.35)	–.12 (.30)	–.11 (.31)	.27 (.47)
3 (mis-pos)	–.17 (.25)	–.08 (.23)	.13 (.27)	–.35 (.43)	.05 (.36)	.28 (.31)	.33 (.33)	.30 (.49)
4 (mis-neg)	–.51* (.25)	.51* (.23)	–.25 (.26)	–.31 (.41)	–.32 (.36)	–.39 (.31)	.42 (.32)	–.06 (.48)
Smoking interest								
2 (medium)	.07 (.22)	–.20 (.20)	.28 (.24)	.35 (.38)	.47 (.32)	.14 (.28)	–.24 (.29)	.54 (.44)
3 (high)	.89*** (.23)	.10 (.22)	1.08*** (.25)	1.85*** (.40)	2.09*** (.34)	1.20*** (.29)	–.44 (.30)	1.57** (.46)
Condition × Smoking interest								
1 × 2	.04 (.33)	–.14 (.30)	.23 (.35)	.06 (.56)	.08 (.48)	.42 (.41)	.06 (.43)	.38 (.65)
1 × 3	–.29 (.34)	**–.67* (.31)**	–.42 (.36)	–.52 (.57)	–.34 (.49)	–.03 (.42)	–.36 (.44)	.32 (.66)
2 × 2	.02 (.30)	.13 (.28)	–.07 (.32)	–.21 (.51)	–.01 (.44)	.03 (.38)	.4 (.39)	–.04 (.59)

2 × 3	–.14 (.32)	–.01 (.29)	–.43 (.34)	–.50 (.53)	.07 (.46)	–.14 (.39)	.12 (.41)	–.02 (.62)
3 × 2	.25 (.31)	**.62* (.29)**	–.05 (.34)	.40 (.53)	–.08 (.46)	–.42 (.39)	–.03 (.41)	–.02 (.62)
3 × 3	–.15 (.32)	–.03 (.30)	–.46 (.35)	–.04 (.55)	–.44 (.47)	–.87 (.40)	–.27 (.42)	–.53 (.63)
4 × 2	.53+ (.32)	–.04 (.29)	.42 (.34)	.37 (.54)	.52 (.46)	.72+ (.40)	–.01 (.41)	–.05 (.62)
4 × 3	.23 (.32)	**–.60* (.29)**	–.05 (.34)	.13 (.54)	.37 (.46)	.25 (.40)	–.60 (.41)	.36 (.63)
1 & 3 vs. Control	*F*(1, 470) = .36	*F*(1, 470) = .85	*F*(1, 470) = .02	*F*(1, 470) = .70	*F*(1, 470) = .11	*F*(1, 470) = .00	*F*(1, 470) = .89	*F*(1, 470) = .06
R^2	.16	.06	.13	.20	.33	.17	.08	.14

Note. Reference categories – condition: control; smoking interest: 1 (*low interest*).

Personality Characteristics

Sensation seeking

High sensation seekers in the control condition (i.e., those who viewed non-smoking videos) were lower in ambivalence compared with low sensation seekers in the control condition; this pattern is reversed for conditions 1 and 3 – namely, low sensation seekers (compared with high sensation seekers) felt more ambivalent about smoking after viewing pro-smoking videos.

	Outcome Variable							
	Beliefs							
	Misleading – benefits	Correct – health risk	Social norm	Attitudes	Intentions (smoking)	Intentions (tobacco)	Self-efficacy	Ambivalence
Condition								
1 (soc-pos)	.07 (.18)	.15 (.16)	.17 (.19)	–.08 (.32)	.22 (.29)	.18 (.23)	.09 (.23)	.54 (.35)
2 (soc-neg)	–.05 (.17)	–.03 (.16)	.05 (.18)	–.11 (.31)	.40 (.28)	.15 (.22)	.14 (.22)	.62^{+} (.35)
3 (mis-pos)	–.04 (.18)	.15 (.16)	.14 (.19)	–.10 (.32)	.17 (.29)	.00 (.23)	.35 (.23)	.70^{+} (.36)
4 (mis-neg)	–.22 (.18)	.28^{+} (.16)	–.09 (.19)	–.28 (.33)	.24 (.30)	.14 (.24)	.32 (.24)	.53 (.37)
High sensation seekers	.56** (.18)	.03 (.16)	.59** (.19)	.45 (.31)	1.22*** (.29)	.68** (.23)	.08 (.23)	1.01** (.35)
Condition × Sensation seeking								
1 × h.s.s.	–.39 (.25)	.00 (.22)	–.44^{+} (.26)	–.52 (.45)	**–.83* (.41)**	–.41 (.32)	–.01 (.32)	**–1.28* (.50)**
2 × h.s.s.	.00 (.25)	.35 (.22)	–.02 (.26)	–.05 (.44)	–.67^{+} (.40)	–.62^{+} (.32)	–.08 (.32)	–.78 (.49)
3 × h.s.s.	–.09 (.25)	.02 (.22)	–.32 (.27)	–.13 (.45)	–.48 (.41)	–.29 (.32)	–.27 (.32)	**–1.13* (.50)**
4 × h.s.s.	.01 (.26)	.03 (.23)	–.05 (.27)	.33 (.46)	–.42 (.42)	–.31 (.33)	–.23 (.33)	–.92^{+} (.51)
1 & 3 vs. Control	$F(1, 475)$ = .01	$F(1, 475)$ = 1.17	$F(1, 475)$ = .86	$F(1, 475)$ = .11	$F(1, 475)$ = .60	$F(1, 475)$ = .19	$F(1, 475)$ = 1.24	***F*(1, 475) = 3.98***
R^2	.08	.03	.06	.03	.08	.04	.01	.02

Note. Reference categories – condition: control; sensation seeking: low sensation seekers.

Demographic Features

Age

	Outcome Variable							
	Beliefs							
	Misleading – benefits	Correct – health risk	Social norm	Attitudes	Intentions (smoking)	Intentions (tobacco)	Self-efficacy	Ambivalence
Condition								
1 (soc-pos)	–.24 (1.33)	.29 (1.14)	.30 (1.39)	–.54 (2.31)	–.48 (2.17)	–1.03 (1.68)	2.33 (1.64)	.37 (2.58)
2 (soc-neg)	–1.16 (1.30)	–.08 (1.12)	–1.61 (1.35)	–1.97 (2.25)	–1.73 (2.12)	–1.80 (1.64)	.16 (1.60)	1.10 (2.52)
3 (mis-pos)	–1.98 (1.26)	–.51 (1.08)	-2.27^{+}(1.31)	–.19 (2.19)	–.12 (2.05)	.26 (1.59)	.27 (1.56)	1.14 (2.44)
4 (mis-neg)	.85 (1.39)	1.87 (1.20)	1.70 (1.46)	1.35 (2.43)	.75 (2.28)	1.05 (1.76)	.53 (1.73)	3.37 (2.71)
Age	–.02 (.05)	.05 (.04)	–.03 (.05)	–.02 (.09)	.01 (.08)	.01 (.06)	.02 (.06)	.08 (.10)
Condition × Age								
1 × Age	.01 (.07)	–.01 (.06)	–.02 (.07)	.01 (.12)	.01 (.12)	.05 (.09)	–.12 (.09)	–.03 (.14)
2 × Age	.06 (.07)	.01 (.06)	.09 (.07)	.10 (.12)	.09 (.11)	.09 (.09)	.00 (.09)	–.05 (.13)
3 × Age	.10 (.07)	.04 (.06)	$.12^{+}$ (.07)	.00 (.12)	.00 (.11)	–.02 (.08)	.00 (.08)	–.06 (.13)
4 × Age	–.06 (.07)	–.08 (.06)	–.10 (.08)	–.08 (.13)	–.04 (.12)	–.06 (.09)	–.02 (.09)	–.18 (.15)
1 & 3 vs. Control	$F(1, 475) = .98$	$F(1, 475) = .01$	$F(1, 475) = .70$	$F(1, 475) = .04$	$F(1, 475) = .03$	$F(1, 475) = .07$	$F(1, 475) = .88$	$F(1, 475) = .12$
R^2	.02	.03	.02	.01	.01	.01	.01	.01

Note. Reference category – condition: control.

Gender

	Outcome Variable							
	Beliefs							
	Misleading – benefits	Correct – health risk	Social norm	Attitudes	Intentions (smoking)	Intentions (tobacco)	Self-efficacy	Ambivalence
Condition								
1 (soc-pos)	–.29 (.18)	.04 (.16)	–.28 (.19)	–.55^{+} (.31)	–.63* (.31)	–.26 (.23)	.02 (.24)	–.14 (.37)
2 (soc-neg)	–.13 (.18)	.27 (.17)	–.19 (.2)	.23 (.32)	.14 (.31)	–.10 (.23)	.18 (.24)	.17 (.37)
3 (mis-pos)	–.06 (.20)	.44* (.18)	–.19 (.21)	–.26 (.34)	–.18 (.34)	–.19 (.25)	.04 (.26)	.27 (.4)
4 (mis-neg)	–.15 (.20)	.30^{+} (.18)	.00 (.21)	.10 (.34)	.22 (.33)	.18 (.24)	.21 (.26)	.03 (.4)
Female	–.76*** (.17)	.42** (.15)	–.76*** (.18)	–1.11*** (.30)	–.68* (.29)	–.92*** (.21)	.07 (.23)	–.84* (.35)
Condition × Female								
1 × Female	.24 (.24)	.19 (.22)	.36 (.26)	.32 (.42)	.70^{+} (.41)	.34 (.30)	.11 (.32)	–.01 (.49)
2 × Female	.11 (.24)	–.24 (.22)	.35 (.26)	–.61 (.42)	–.19 (.41)	–.09 (.30)	–.13 (.32)	.08 (.49)
3 × Female	.03 (.25)	**–.48* (.23)**	.33 (.27)	.26 (.43)	.19 (.43)	.15 (.31)	.26 (.33)	–.13 (.51)
4 × Female	–.07 (.25)	–.04 (.23)	–.15 (.27)	–.26 (.44)	–.30 (.43)	–.27 (.32)	–.02 (.34)	.10 (.51)
1 & 3 vs. Control	$F(1, 475) = 1.13$	$F(1, 475) = 2.72^{+}$	$F(1, 475) = 1.87$	$F(1, 475) = 2.06$	$F(1, 475) = 2.17$	$F(1, 475) = 1.18$	$F(1, 475) = .02$	$F(1, 475) = .04$
R^2	.15	.07	.10	.15	.06	.16	.01	.06

Note. Reference categories – condition: control; gender: male.

Race/ethnicity

	Outcome Variable							
	Beliefs							
	Misleading – benefits	Correct – health risk	Social norm	Attitudes	Intentions (smoking)	Intentions (tobacco)	Self-efficacy	Ambivalence
Condition								
1 (soc-pos)	–.14 (.16)	.10 (.14)	–.01 (.17)	–.38 (.28)	–.14 (.26)	.04 (.20)	.12 (.20)	–.09 (.31)
2 (soc-neg)	–.09 (.16)	.08 (.14)	.00 (.17)	–.33 (.28)	.00 (.27)	–.33 (.21)	.10 (.20)	.05 (.32)
3 (mis-pos)	–.03 (.16)	.13 (.14)	.09 (.17)	–.1 (.28)	–.06 (.26)	–.19 (.20)	.28 (.20)	.06 (.31)
4 (mis-neg)	–.07 (.17)	.22 (.15)	–.07 (.18)	.12 (.29)	.04 (.28)	–.04 (.21)	.34 (.21)	.09 (.33)
Non-White	.08 (.19)	–.17 (.17)	.09 (.20)	–.01 (.33)	.02 (.31)	.08 (.24)	.23 (.24)	.00 (.37)
Condition × Non-White								
1 × Non-White	–.03 (.28)	.13 (.24)	–.18 (.29)	.12 (.48)	–.29 (.45)	–.22 (.35)	–.07 (.34)	–.16 (.54)
2 × Non-White	.01 (.26)	.17 (.23)	–.01 (.28)	.42 (.46)	–.01 (.43)	.32 (.33)	–.01 (.33)	.30 (.51)
3 × Non-White	–.21 (.27)	.10 (.24)	–.37 (.29)	–.21 (.47)	–.17 (.45)	.05 (.35)	–.15 (.34)	.09 (.53)
4 × Non-White	–.41 (.27)	.23 (.24)	–.17 (.29)	–.57 (.48)	–.13 (.45)	–.02 (.35)	–.32 (.34)	–.16 (.53)
1 & 3 vs. Control	$F(1, 472) = .37$	$F(1, 472) = .88$	$F(1, 472) = .08$	$F(1, 472) = .31$	$F(1, 472) = .20$	$F(1, 472) = .19$	$F(1, 472) = 1.40$	$F(1, 472) = .00$
R^2	.02	.02	.01	.02	.01	.01	.01	.01

Note. Reference categories – condition: control; race: White.

Appendix G. Analyses using Message Characteristics (Study 3)

Question: Can pro-smoking videos' message characteristics predict outcomes?

Analysis:

- Analysis with N = 385 participants who were exposed to 2 pro-smoking videos; conditions 1-4 only (excluding n = 100 participants in the control condition)
- Message-level message characteristics scores were obtained from the video evaluations after 3rd exposure (20-35 ratings/pro-smoking video)
- For each individual, the overall message-set-level scores were calculated by summing the corresponding message-level ratings for the 2 pro-smoking videos that the individual was exposed to
- **IV**: summed message-set-level scores based on 2 video exposures
- **DV**: individual smoking-related outcome measures

Summary: There seems to be no clear-cut mechanism that explains the lack of effect of these pro-smoking videos. No conclusions can be drawn from this set of analyses based on summed message-level scores.

Credibility

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Credibility	.03 (.09)	–.04 (.07)	.06 (.09)	–.20 (.15)	–.07 (.14)	–.04 (.11)	–.15 (.11)	–.08 (.17)
R^2	.00	.00	.00	.00	.00	.00	.00	.00

Perceived Effectiveness

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level PE	.09 (.17)	.08 (.14)	.07 (.17)	–.29 (.28)	–.06 (.27)	–.25 (.21)	–.24 (.21)	–.22 (.32)
R^2	.00	.00	.00	.00	.00	.00	.00	.00

Novelty

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Novelty	.02 (.11)	.05 (.09)	.03 (.11)	–.28 (.18)	–.13 (.17)	–.06 (.13)	–.09 (.13)	–.16 (.21)
R^2	.00	.00	.00	.01	.00	.00	.00	.00

Defensiveness

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Defensiveness	.07 (.13)	.14 (.11)	–.06 (.13)	.22 (.22)	–.01 (.21)	–.05 (.16)	.25 (.16)	–.23 (.25)
R^2	.00	.00	.00	.00	.00	.00	.01	.00

Positive Emotions

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Positive Emotions	.13 (.15)	.25^{+} (.13)	.03 (.15)	.01 (.25)	.04 (.24)	–.17 (.18)	.21 (.18)	–.12 (.29)
R^2	.00	.01	.00	.00	.00	.00	.00	.00

Negative Emotions

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Negative Emotions	–.16 (.18)	–.08 (.15)	.11 (.18)	–.38 (.30)	–.44 (.28)	.08 (.22)	.09 (.22)	–.59^{+} (.34)
R^2	.00	.00	.00	.00	.01	.00	.00	.01

Disgust

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Disgust	.17 (.12)	–.04 (.10)	.18 (.12)	–.11 (.20)	–.13 (.19)	.12 (.14)	.15 (.14)	–.07 (.22)
R^2	.01	.00	.01	.00	.00	.00	.00	.00

Engagement

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Engagement	.04 (.19)	.22 (.16)	.11 (.19)	–.60^{+} (.31)	–.41 (.30)	–.23 (.23)	.10 (.23)	–.68^{+} (.36)
R^2	.00	.01	.00	.01	.00	.00	.00	.01

Empathy

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Engagement	.13 (.19)	.11 (.15)	.03 (.19)	–.56^{+} (.30)	–.30 (.29)	–.36 (.22)	–.07 (.22)	–.57 (.35)
R^2	.00	.00	.00	.01	.00	.01	.00	.01

Video Length

	Outcome Variable							
	Beliefs		Social norms	Attitudes	Intentions (cigarette)	Intentions (other)	Self-efficacy	Ambivalence
	Misleading – benefits	Correct – health risk						
Message-set-level Video length	.00 (.00)	.00 (.00)	–.00 (.00)	.00 (.00)	–.00 (.00)	–.00 (.00)	.00 (.00)	–.00 (.00)
R^2	.00	.01	.00	.00	.00	.00	.00	.00

Appendix H. An Examination of Video-Level Evaluations (Study 3)

Summary

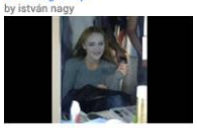
- Participants were asked to evaluate one pro-smoking video (even if they were in the control condition) that they were not shown previously.
- Generally speaking, category-wise it seems that social acceptance videos were slightly more persuasive than misleading claims videos, and evaluation-wise it seems that positively evaluated videos were slightly more persuasive than negatively evaluated videos.

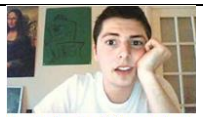
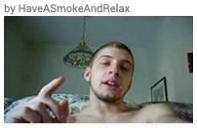
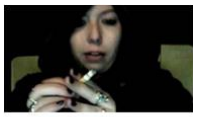
Message-Level Descriptive Statistics by Condition

	Condition	N	PE	Defensiveness	Positive emotions	Negative emotions	Engagement	Empathy
1	Social acceptance Positively evaluated	125	2.64 (0.80)	2.24 (0.81)	1.94 (1.00)	3.00 (0.85)	2.27 (0.76)	2.54 (1.20)
2	Social acceptance Negatively evaluated	129	2.58 (0.89)	2.35 (0.76)	2.15 (1.06)	2.89 (0.88)	2.18 (0.76)	2.55 (1.14)
3	Misleading claims Positively evaluated	115	2.56 (0.99)	2.54 (0.86)	2.24 (1.11)	2.82 (0.87)	2.24 (0.78)	2.62 (1.23)
4	Misleading claims Negatively evaluated	116	2.43 (0.96)	2.51 (0.96)	2.21 (1.05)	2.77 (0.87)	2.07 (0.86)	2.44 (1.22)
	TOTAL	485	2.54 (0.91)	2.40 (0.85)	2.13 (1.06)	2.87 (0.87)	2.19 (0.79)	2.54 (1.20)

Message-Level Descriptive Statistics by Video

Marked in red are videos that scored better than the average in terms of message characteristics predictive of effectiveness (specifically, higher than the average for PE, positive emotions, engagement, and empathy; lower than the average for defensiveness and negative emotions).

Condition	Video	N	PE	Defensiveness	Positive emotions	Negative emotions	Engagement	Empathy
Social acceptance / positively evaluated	 Hollywood/Celebs Smokers by JolyTracyLynOfficial	32	2.99 (0.69)	2.20 (0.84)	2.18 (1.15)	2.76 (1.03)	2.38 (0.86)	2.75 (1.28)
	 KC smokes a whole cigarette in record time by Will Presley	32	2.74 (0.80)	2.50 (0.88)	1.93 (1.09)	2.90 (0.83)	2.41 (0.68)	2.64 (1.18)
	 man smokes a whole cigarette in one drag by finallyitshere	31	2.20 (0.76)	2.15 (0.81)	1.76 (0.85)	3.30 (0.70)	1.91 (0.73)	2.24 (1.12)
	 1 cigarette 1 drag by Jorge Murillo	30	2.62 (0.79)	2.09 (0.65)	1.88 (0.89)	3.08 (0.72)	2.35 (0.67)	2.52 (1.19)
Social acceptance / negatively evaluated	 How To Smoke a Cigarette by Drew Verdrame	34	2.83 (0.83)	2.24 (0.71)	2.17 (1.00)	2.57 (0.92)	2.21 (0.77)	2.71 (1.22)
	 Justin Bieber Sexy Schoolgirls Smoking 360p by istván nagy	33	2.29 (0.91)	2.54 (0.87)	1.92 (1.02)	2.92 (0.99)	1.89 (0.72)	2.15 (1.20)
	 Supermodels Smoking by superninanova	27	2.41 (0.90)	2.28 (0.79)	1.87 (1.03)	2.96 (0.87)	2.05 (0.78)	2.44 (1.07)
	 Pete Firman's Illegal Smoking Trick by ToNiBuM77	35	2.76 (0.86)	2.32 (0.65)	2.55 (1.10)	3.12 (0.67)	2.54 (0.66)	2.84 (0.98)

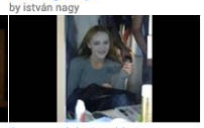
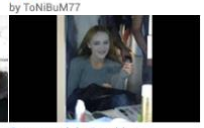
Misleading claims / positively evaluated	 How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) by swordfish3r's channel	33	2.55 (1.02)	2.65 (0.94)	2.30 (1.07)	2.98 (0.87)	2.41 (0.78)	2.71 (1.21)
	 Warning Labels on Tobacco Products - RANT by HaveASmokeAndRelax	29	2.68 (1.00)	2.52 (0.89)	2.34 (1.16)	2.86 (0.89)	2.32 (0.70)	2.72 (1.23)
	 Smoking is good for you! Rant. by johnantinarelli	33	2.51 (0.98)	2.35 (0.82)	2.15 (1.14)	2.74 (0.90)	2.14 (0.87)	2.64 (1.33)
	 The Pros of Smoking Cigarettes by Spa Week	20	2.46 (0.98)	2.70 (0.73)	2.16 (1.13)	2.62 (0.79)	2.01 (0.73)	2.28 (1.13)
Misleading claims / negatively evaluated	 How to Hide smoking & the smel by PugPrincessBro	29	2.24 (0.89)	2.14 (0.95)	2.06 (0.91)	2.74 (0.71)	1.96 (0.73)	2.16 (0.93)
	 How To Look As Cool As Possible. (While smoking a... by Wrenaux Stewart	29	2.41 (0.94)	2.66 (0.91)	2.30 (1.07)	2.85 (0.83)	2.14 (0.76)	2.50 (1.29)
	 How to smoke a cigarette! by Richard McDonald	33	2.56 (0.85)	2.36 (0.89)	2.19 (1.07)	2.76 (1.00)	2.00 (0.84)	2.50 (1.24)
	 SMOKING IS COOL! by MrJIMMYPIMPS	25	2.52 (1.20)	2.95 (0.98)	2.30 (1.19)	2.74 (0.97)	2.23 (1.13)	2.60 (1.43)

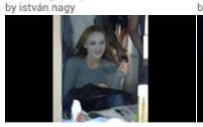
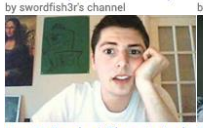
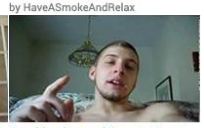
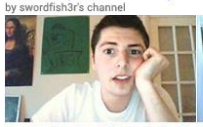
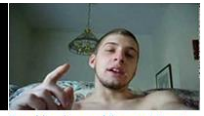
Was any combination of pro-smoking videos particularly effective?

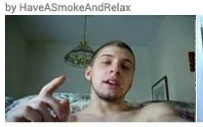
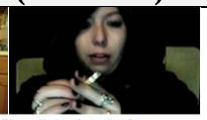
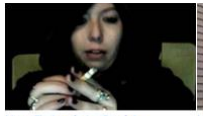
There were 24 possible combinations of pro-smoking videos for those that were not in the control condition. Which 2 pro-smoking videos were the most effective? Some combinations seem to have been more effective than others; but even so, it is difficult to find videos that were significantly worse than the control videos.

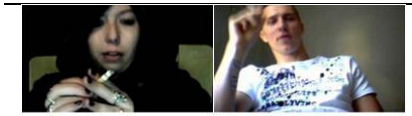
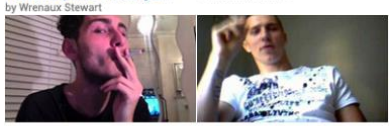
Marked in red are video combinations that scored better than the control videos in terms of having deleterious effects.

Video combinations	*N*	Outcome Variable							
		Beliefs		Social norms	Attitudes	Intentions (smoking)	Intentions (other)	Self-efficacy	Ambival ence
		Misleading – benefits	Correct – health risk						
CONDITION 1 (SOC-POS)									
	16	2.56 (0.89)	4.09 (0.59)	2.67 (0.84)	–2.04 (1.41)	1.75 (1.29)	1.84 (1.06)	3.88 (1.08)	1.63 (1.78)
	18	2.62 (0.88)	3.57 (0.88)	2.68 (0.81)	–1.41 (1.68)	2.50 (1.58)	2.14 (1.20)	3.68 (1.22)	1.89 (1.92)
	19	2.26 (0.67)	3.98 (0.7)	2.74 (0.81)	–2.14 (1.18)	2.32 (1.53)	1.79 (0.75)	3.47 (1.01)	2.26 (1.74)
	13	2.63 (0.90)	3.64 (0.99)	2.71 (0.74)	–2.54 (0.63)	1.77 (1.17)	2.23 (0.86)	3.75 (1.20)	1.88 (1.45)

 	12	3.03 (0.79)	3.85 (0.68)	3.27 (0.78)	–1.08 (1.66)	3.42 (1.44)	2.71 (1.37)	3.90 (0.90)	3.00 (1.62)
 	20	2.72 (0.93)	3.93 (0.71)	2.74 (0.84)	–1.76 (1.62)	2.25 (1.29)	2.40 (1.20)	3.86 (0.92)	2.00 (1.91)
CONDITION 2 (SOC-NEG)									
 	13	2.42 (0.9)	3.83 (1.04)	2.47 (0.97)	–1.52 (1.90)	2.38 (1.71)	1.73 (1.03)	3.51 (1.27)	2.54 (1.30)
 	22	2.79 (0.70)	3.75 (0.99)	2.90 (0.81)	–1.39 (1.6)	3.18 (1.50)	2.20 (1.10)	3.35 (1.25)	2.57 (1.90)
 	16	2.69 (0.87)	3.73 (0.81)	2.86 (0.93)	–1.81 (1.76)	2.56 (1.59)	2.41 (1.00)	3.88 (0.97)	2.59 (1.87)
 	24	2.78 (1.12)	3.89 (0.75)	2.79 (0.95)	–1.40 (1.64)	2.38 (1.47)	2.08 (1.22)	3.83 (1.28)	2.52 (1.78)

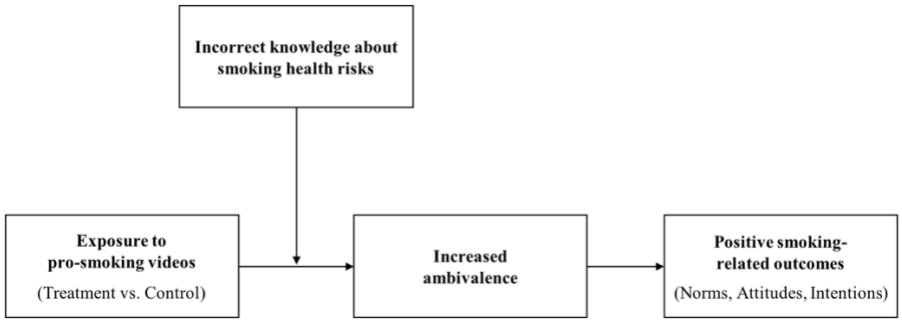
 Justin Bieber Sexy Schoolgirls Smoking 360p by istván nagy  Pete Firman's Illegal Smoking Trick by ToNiBuM77	10	2.53 (1.09)	3.77 (1.04)	3.13 (0.91)	–1.48 (1.73)	2.80 (0.92)	1.85 (1.31)	3.68 (1.31)	1.95 (1.34)
 Supermodels Smoking by superninanova  Pete Firman's Illegal Smoking Trick by ToNiBuM77	19	2.64 (0.96)	3.93 (0.84)	2.99 (0.89)	–2.28 (1.04)	2.00 (1.41)	1.74 (1.07)	4.31 (0.97)	2.03 (1.83)
CONDITION 3 (MIS-POS)									
 How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) by swordfish3r's channel  Warning Labels on Tobacco Products - RANT by HaveASmokeAndRelax	11	2.81 (0.96)	4.13 (0.35)	2.84 (1.22)	–2.00 (1.36)	1.91 (1.3)	2.09 (1.48)	3.87 (1.2)	1.05 (1.51)
 How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) by swordfish3r's channel  Smoking is good for you! Rant. by johnantinarelli	14	2.30 (0.69)	3.65 (0.61)	2.46 (0.95)	–2.27 (1.06)	1.93 (1.07)	1.82 (0.93)	3.94 (1.04)	2.46 (1.94)
 How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) by swordfish3r's channel  The Pros of Smoking Cigarettes by Spa Week	17	2.66 (0.99)	3.89 (0.86)	2.75 (1.12)	–1.47 (1.76)	2.71 (1.53)	2.12 (1.26)	4.02 (1.10)	1.82 (1.64)
 Warning Labels on Tobacco Products - RANT by HaveASmokeAndRelax  Smoking is good for you! Rant. by johnantinarelli	13	2.51 (0.78)	3.69 (1.04)	2.65 (0.71)	–1.92 (0.92)	2.15 (1.57)	1.27 (0.60)	3.34 (1.65)	2.00 (1.38)

 Warning Labels on Tobacco Products - RANT by HaveASmokeAndRelax  The Pros of Smoking Cigarettes by Spa Week	28	2.83 (0.99)	4.08 (0.47)	3.04 (0.95)	–1.22 (1.69)	2.71 (1.41)	2.27 (1.21)	3.90 (0.88)	2.84 (1.94)
 Smoking is good for you! Rant. by johnantinarelli  The Pros of Smoking Cigarettes by Spa Week	12	2.58 (1.03)	3.54 (0.96)	2.88 (1.08)	–1.70 (1.30)	2.67 (1.44)	2.42 (1.28)	4.20 (0.80)	3.08 (1.41)
CONDITION 4 (MIS-NEG)									
 How to Hide smoking & the smell by PugPrincessBro  How To Look As Cool As Possible. (While smoking a... by Wrenaux Stewart	12	3.02 (1.16)	3.84 (0.97)	3.40 (1.23)	–0.45 (2.49)	3.50 (1.57)	2.88 (1.57)	3.98 (1.14)	3.25 (1.52)
 How to Hide smoking & the smell by PugPrincessBro  How to smoke a cigarette! by Richard McDonald	10	2.70 (0.73)	4.03 (0.53)	2.78 (0.92)	–2.24 (0.74)	2.10 (1.52)	2.15 (1.16)	3.76 (1.26)	2.60 (1.91)
 How to Hide smoking & the smell by PugPrincessBro  SMOKING IS COOL! by MrJIMMYPIMPS	18	2.09 (0.88)	4.10 (0.69)	2.17 (1.02)	–2.23 (1.14)	2.00 (1.33)	1.75 (0.91)	3.93 (1.22)	2.06 (1.73)
 How To Look As Cool As Possible. (While smoking a... by Wrenaux Stewart  How to smoke a cigarette! by Richard McDonald	16	2.50 (0.95)	4.04 (0.56)	2.78 (0.96)	–1.39 (1.51)	3.00 (1.46)	2.28 (0.95)	3.73 (1.18)	2.78 (1.64)

	18	2.55 (0.85)	4.17 (0.45)	2.74 (1.04)	–1.52 (1.78)	2.06 (1.35)	2.06 (1.00)	4.20 (0.91)	1.36 (1.62)
	14	2.46 (0.77)	3.74 (0.62)	2.71 (1.00)	–1.70 (1.31)	2.79 (1.63)	2.14 (1.08)	3.51 (1.25)	1.93 (1.5)
TOTAL	385	2.61 (0.90)	3.89 (0.75)	2.79 (0.94)	–1.69 (1.54)	2.45 (1.47)	2.10 (1.13)	3.81 (1.12)	2.26 (1.75)
		$F = 0.93$	$F = 0.99$	$F = 1.09$	$F = 1.51$	$F = 1.74^{*}$	$F = 1.33$	$F = 0.83$	$F = 1.46^{+}$

Appendix I. Regression Results for Conditional Indirect Effects of Exposure on Outcomes through Ambivalence, based on Knowledge (Study 3)

Analysis: Preacher and Hayes' (2008) PROCESS macro



DV: Social Norms about Peer Smoking

	Ambivalence (Mediator variable model)			
Predictor	*B*	*SE*	*t*	*p*
Constant	2.32	0.26	9.08	< .001
X (Pro-smoking video exposure)	–0.37	0.28	–1.31	.192
W (Incorrect knowledge)	–0.20	0.35	–0.59	.557
X × W	0.89	0.39	2.29	.023
	Favorable norms (Dependent variable model)			
Predictor	*B*	*SE*	*t*	*p*
Constant	2.37	0.10	23.60	< .001
X (Pro-smoking video exposure)	–0.07	0.10	–0.73	.469
M (Ambivalence)	0.22	0.02	9.66	< .001
	Conditional effects			
W (Incorrect knowledge)	Indirect effect	*SE*	LL 95% CI	UL 95% CI
0 (*correct*)	–0.08	0.07	–0.22	0.05
1 (*incorrect*)	0.11	0.06	0.01	0.23

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LL = lower limit; UL = upper limit; CI = confidence interval. Reference categories – pro-smoking video exposure is compared with the baseline of exposure to control videos (i.e., treatment vs. control); knowledge: incorrect knowledge is compared with the baseline of correct knowledge regarding the health risks of smoking. The difference between the conditional indirect effects was significant: 0.19, 95% bootstrap CI = 0.03 to 0.38. N = 485.

DV: Attitudes toward Smoking

	Ambivalence (Mediator variable model)			
Predictor	*B*	*SE*	*t*	*p*
Constant	2.32	0.26	9.08	< .001
X (Pro-smoking video exposure)	–0.37	0.28	–1.31	.192
W (Incorrect knowledge)	–0.20	0.35	–0.59	.557
X × W	0.89	0.39	2.29	.023
	Favorable attitudes (Dependent variable model)			
Predictor	*B*	*SE*	*t*	*p*
Constant	–2.44	0.16	–15.39	< .001
X (Pro-smoking video exposure)	–0.23	0.15	–1.51	.132
M (Ambivalence)	0.43	0.04	12.16	< .001
	Conditional effects			
W (Incorrect knowledge)	Indirect effect	*SE*	LL 95% CI	UL 95% CI
0 (*correct*)	–0.16	0.14	–0.44	0.10
1 (*incorrect*)	0.23	0.11	0.02	0.45

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LL = lower limit; UL = upper limit; CI = confidence interval. Reference categories – pro-smoking video exposure is compared with the baseline of exposure to control videos (i.e., treatment vs. control); knowledge: incorrect knowledge is compared with the baseline of correct knowledge regarding the health risks of smoking. The difference between the conditional indirect effects was significant: 0.39, 95% bootstrap CI = 0.05 to 0.75. N = 485.

DV: Intentions to Smoke (Cigarettes)

	Ambivalence (Mediator variable model)			
Predictor	*B*	*SE*	*t*	*p*
Constant	2.32	0.26	9.08	< .001
X (Pro-smoking video exposure)	–0.37	0.28	–1.31	.192
W (Incorrect knowledge)	–0.20	0.35	–0.59	.557
X × W	0.89	0.39	2.29	.023
	Favorable intentions (Dependent variable model)			
Predictor	*B*	*SE*	*t*	*p*
Constant	1.73	0.15	11.30	< .001
X (Pro-smoking video exposure)	–0.11	0.15	–0.73	.466
M (Ambivalence)	0.37	0.03	10.72	< .001
	Conditional effects			
W (Incorrect knowledge)	Indirect effect	*SE*	LL 95% CI	UL 95% CI
0 (*correct*)	–0.14	0.12	–0.38	0.09
1 (*incorrect*)	0.19	0.10	0.01	0.39

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. LL = lower limit; UL = upper limit; CI = confidence interval. Reference categories – pro-smoking video exposure is compared with the baseline of exposure to control videos (i.e., treatment vs. control); knowledge: incorrect knowledge is compared with the baseline of correct knowledge regarding the health risks of smoking. The difference between the conditional indirect effects was significant: 0.33, 95% bootstrap CI = 0.03 to 0.64. N = 485.

Appendix J. Debunking Misleading Information in Pro-Smoking Videos Using YouTube In-Video Advertisements (Proposed Study)

Keeping in mind that youth tend to underestimate the negative health costs of smoking and are overly optimistic about the ease of quitting smoking (Arnett, 2000; Romer & Jamieson, 2001; Romer, Jamieson, & Ahern, 2001), susceptible youth are at heightened risk because they are more likely to seek out pro-smoking content that confirms and exacerbates their existing views about smoking.

Research has shown that repeated exposure – even exposure to questionable information – can make the information appear credible due to familiarity effects (Begg et al., 1992; Weaver et al., 2007). Thus, it is of interest to design an intervention that helps inoculate against the negative effects exposure to pro-smoking videos may have on youth. Specifically, I propose to place anti-smoking public service announcements (PSAs) in YouTube in-video advertisements as a way to target susceptible youth.

Advertising on YouTube

Advertising in social media contexts, especially online video advertising, remains a relatively new area of research (see J. Knoll, 2016 for a review). Nevertheless, such advertising is becoming more widespread and YouTube is growing as a platform for advertisers. To this point, in 2012, advertisements were viewed 3 billion times each week on YouTube (Pashkevich, Dorai-Raj, Kellar, & Zigmond, 2012).

Since pro-smoking videos are already readily available on YouTube, the present study proposes using this platform to target viewers. Practically speaking, it would be more convenient and efficient to target viewers of YouTube videos through YouTube.

One of the greatest obstacles for public health initiatives is in reaching target audiences so that they gain adequate exposure to the message (see Hornik, 2002). For instance, a meta-analysis of HIV-prevention interventions found that individuals who were least likely to wear condoms and therefore were most in need of prevention programs were more likely to turn down the opportunity to participate compared with individuals who regularly used condoms (Noguchi, Albarracín, Durantini, & Glasman, 2007). Thus, developing the right messages is important but getting the "right" at-risk people to view them is another – perhaps even more daunting – challenge.

A second challenge concerns the matter of developing correctives. Although the literature makes some suggestions (e.g., Cappella, Maloney, Ophir, & Brennan, 2015; Cook & Lewandowsky, 2012; Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012), crafting correctives is tricky. First and foremost, misinformation is notoriously difficult to correct, and secondly, corrective attempts may backfire or leave negative affective residues, or *belief echoes* (Johnson & Seifert, 1994; Thorson, 2016). Another practical issue is whether it is possible to develop correctives for each new piece of misinformation that is uploaded on the Internet. Although creating new materials may be more effective at directly addressing the specific misinformation, it would be impractical to develop a corrective for each new piece of misinformation. Therefore, if existing anti-smoking messages that have been professionally developed can effectively correct misconceptions related to smoking, this would be a cost-effective solution to combat broadening availability of misinformation online. Also, engaging correctives in the form of video (as opposed to text-based correctives) might be the most effective way to combat video-form misinformation.

In short, using existing anti-smoking PSAs as non-skippable video advertisements on YouTube could be an ecologically valid and efficient strategy both from an exposure standpoint and a messaging standpoint. If anti-smoking PSAs are effective against misinformation, the results would be relevant to existing campaigns. The results of this study can also be informative to the people at Google who are making efforts to tackle misinformation (e.g., Mooney, 2015) and alternatively public health practitioners who might consider buying advertisements on YouTube (instead of more traditional media sources like television or radio) in order to target younger audiences. From Study 1, we know that at-risk youth are more likely to click on pro-smoking content so if we can attach an anti-smoking advertisement to these pro-smoking videos, it could be a way to get the right audience some exposure to the right messages.

Forewarnings in the Form of Anti-Smoking PSAs

Warning people about an upcoming persuasive attempt alerts people to defend themselves and resist the attempt. The mechanism through which forewarnings are hypothesized to work are by generation of counterarguments and/or psychological reactance (Brehm & Brehm, 1981; McGuire, 1961; Petty & Cacioppo, 1977). Forewarning research is closely related to inoculation theory which is based on the biological metaphor of exposing people to a weakened dose of the virus to make the person more resistant to future viral attacks (McGuire, 1964).

While early reviews of forewarnings had mixed results regarding its impact on attitudes (e.g., Cialdini & Petty, 1981; Eagly & Chaiken, 1993; Petty & Wegener, 1998), a more recent meta-analysis by Wood and Quinn (2003) found that across studies, participants who were warned changed their attitudes less than control participants who

received no warning. In other words, participants who received warnings were able to resist the persuasive appeal that followed. Moderation analyses revealed that the effects of forewarnings were heightened (a) when the message topic was highly involving and (b) when participants were not distracted between the warning and message (Wood & Quinn, 2003). These results suggest that warnings exert their effectiveness when people have the motivation and ability to develop counterarguments against the impending message.[6]

Use of anti-smoking PSAs as in-video advertisements may be effective as forewarnings because (a) for susceptible youth – who is our population of interest – the topic of smoking will be involving, and (b) there will be no time interval between the warning and message (i.e., no distraction). In addition, the literature found that anticipatory warning-induced agreement was higher when the warning came from a reputable source (Wood & Quinn, 2003). Since anti-smoking PSAs have been professionally developed, by reputable sources, I assume that they will appear credible, especially in contrast to the user-generated videos that follow where people (whose credibility is unknown) talk about the positive aspects of smoking. Moreover, forewarnings presented in more engaging modalities (video or audio) induced more initial agreement with the warning as well, compared with text-based forewarnings (Wood & Quinn, 2003). Therefore, based on the literature, video-based, professionally developed, anti-smoking PSAs may be effective at warning people about the impending pro-smoking message.

[6] Note that the results of this meta-analysis might not necessarily translate to our study because there is no evidence that the studies included in this meta-analysis concerned high risk behaviors such as smoking. Many studies included in the meta-analysis were about university policies.

Of course, anti-smoking PSAs may backfire. In general, people do not like being persuaded and being told what to do. A body of research suggests that there is an association between perceived persuasive intent and increases in resistance, which makes persuasion difficult: The more implicit the persuasive intent, the more accepting receivers are of the message (Brehm & Brehm, 1981; Moyer-Gusé, 2008; Moyer-Gusé, Jain, & Chung, 2012; Weinstein, Grubb, & Vautier, 1986). It is possible that when anti-smoking PSAs are presented in the form of YouTube advertisements, the persuasive intent may be less obvious. Another possibility is that resistance to these advertisements (and not to the later message) could result in backfiring or alternatively clicking out of the video. A study conducted by researchers at Google found that participants, when faced with in-video ads, spent less time watching videos compared with when the video had skippable ads or no ads at all (Pashkevich et al., 2012). This could also be a positive – albeit unintended – consequence. Since little is known about the use of PSAs as in-video advertisements, the following questions are asked:

> RQ1-4: Does exposure to anti-smoking in-video advertisements positively affect (1) beliefs, (2) attitudes, (3) social norms, and (4) behavioral intentions associated with smoking compared with exposure to a non-related advertisement or no advertisement at all?

Targeted vs. Non-Targeted Forewarnings

Contrary to previous research that suggested that there was a meaningful difference between *general warnings* that address the persuasive intent and *specific warnings* that specify the message topic and stance (e.g., Cialdini & Petty, 1981; Eagly & Chaiken, 1993; Petty & Wegener, 1998), the meta-analysis by Wood and Quinn (2003)

found that resistance emerged regardless of the type of forewarning. In other words, specific warnings and general warnings were both equally effective in generating resistance to the upcoming message.

Although using anti-smoking PSAs as in-video advertisements may be different from forewarnings per say, it relies upon a similar strategy. Anti-smoking campaigns generally try to warn adolescents to stay away from cigarettes and alert viewers to the negative consequences of smoking. Such "warnings" are in direct contrast to the messages of interest in this study, which are pro-smoking videos that depict smoking in a positive light. Here, I make the distinction between targeted PSAs and non-targeted PSAs although they are not directly parallel to the traditional types of general and specific forewarnings. *Non-targeted PSAs* are anti-smoking PSAs that do not target any of the specific arguments in the pro-smoking videos. While these PSAs do not directly address the topic and stance of the impending message, they provide a warning in reminding people of the negative consequences of smoking. In contrast, *targeted PSAs* are anti-smoking PSAs that directly address at least one aspect of misinformation (or misleading information) mentioned or implied in the upcoming pro-smoking message. Recall that the forewarning literature suggests that the effectiveness of warnings relies upon cognitive processing and generation of counterarguments. Therefore, if the anti-smoking PSA is specific and touches upon similar topics mentioned in the pro-smoking video, individuals may become more attentive to or skeptical of the positive depictions of smoking and engage in more counterarguing. Although non-targeted anti-smoking PSAs may also alert viewers so that they are in a more defensive state, the PSAs may fall short in inoculating viewers because there will be less opportunities for them to counterargue (because none

of the PSA arguments were directly relevant to the pro-smoking videos), making it easier for them to become distracted. Thus, I hypothesize that,

> H1-4: Exposure to anti-smoking in-video advertisements that are specifically targeted at the misleading claims made in pro-smoking videos will positively affect (1) beliefs, (2) attitudes, (3) social norms, and (4) behavioral intentions associated with smoking compared with exposure to anti-smoking in-video advertisements that are less relevant.

Method

Subjects

A national sample of 400 U.S. adolescents and young adults between the ages of 15 and 21 years will be recruited through an online research panel such that there will be approximately 100 participants for each of the four experimental conditions.

Smoking interest (adapted from Pierce et al., 1996) will be used as a quota. 100 participants per smoking interest level will be recruited (i.e., n = 100 with a score 0, n = 100 with a score 1, n = 100 with a score 2, n = 100 with a score 3). Each condition will be stratified by smoking susceptibility so that there will be approximately 25 of each susceptibility level per condition.

Stimulus Material

Pro-Smoking Videos

Pro-smoking videos were selected based on selective exposure patterns of youth with high interest in smoking using data from Study 1: (a) videos that were watched – on average – more than halfway through by at-risk youth once clicked and (b) videos that had higher than average positive reactions and engagement evaluations by at-risk youth.

Since only five videos satisfied these two criteria, videos that were watched more than halfway through and were evaluated more positively by youth with high interest in smoking than youth with low interest in smoking were added to the stimulus pool (n = 3). The final stimulus pool consisted of eight pro-smoking videos.

Then, based on the content of these pro-smoking videos, two general classes of videos were identified: Social acceptance videos and misleading claims videos. Note that the two longest videos were edited so that length would be more equivalent within category.

Social acceptance videos. Videos in this category promote pluralistic ignorance about either the prevalence (descriptive norm) or acceptability (injunctive norm) of smoking. All of these videos portray smoking in a positive light, conveying social acceptability of smoking by showing social rewards (e.g., cheering by friends, desirability/attractiveness). One example would be a video in which a young man smokes a whole cigarette in one drag in front of a group of friends. In this video, social approval is apparent from the anticipation and cheering of friends around him (e.g., "that's a real champ right there"). The misinformation here is mostly visual and inferential.

Misleading claims videos. Videos in this category contain either implicit or explicit misleading claims related to an aspect of smoking. These videos sometime downplay the health consequences of smoking by use of an argument by "false equivalency." For example, equating the risks of smoking to the risks of dying in a car accident, walking down the street, or drinking tap water implies that the risks of the two are equivalent. Other videos emphasize the benefits of smoking (and largely ignore the costs of smoking) by talking about how smoking feels good, how smoking allows you to

take more breaks, how smoking helps you get promoted, among some examples. The misinformation here is usually based on actual claims made by the people in the video.

All participants will view two pro-smoking videos that are randomly assigned from each category so that they get exposed to both "types" of pro-smoking videos. In the selective exposure experiment (Study 1), participants viewed .71 pro-smoking videos and watched 1.13 minutes of pro-smoking video content on average. This exposure pattern was associated with more positive attitudes and social norms associated with smoking (see results of Study 2). It is expected that the impact of pro-smoking videos will be heightened due to two design features of this study. The first is greater exposure. By forcing exposure to two pro-smoking videos, participants will watch pro-smoking videos for an average of 4.03 minutes (range: 3.12 to 5.55 minutes), which is approximately three to four times the average exposure participants had to pro-smoking videos in Study 1. Second, the choice of stimulus materials was based on a careful analysis of post-exposure reactions to the pro-smoking videos by susceptible youth. The videos that elicited greater positive reactions and engagement were chosen for this study. Recall that the videos had higher than average positive reactions and engagement evaluations by at-risk youth or those that were evaluated more favorably by youth with high interest in smoking compared with youth with low interest in smoking were chosen as stimulus materials. Therefore, this set of pro-smoking videos has the potential to be particularly persuasive to susceptible youth.

In-Video Advertisements

This study will make use of YouTube advertising formats – specifically, long, non-skippable video ads that can be up to 30 seconds long (YouTube, n.d.). All

advertisements that are used in this study will be 30 seconds. All participants – with the exception of those who are assigned to the no ad control condition – will view two advertisements and two pro-smoking videos. Each advertisement will be placed immediately before the pro-smoking video starts playing. There will be multiple advertisements per condition in an attempt to increase generalizability and to help circumvent the issue of case-category confounding (Jackson, 1992).

Targeted PSAs. From a pool of anti-smoking PSAs, PSAs which directly addressed at least one aspect of misinformation (or misleading information) mentioned or implied in the pro-smoking videos were identified. Since these anti-smoking PSAs are real messages, they are not always perfectly pertinent to the pro-smoking videos. Nevertheless, they touch upon at least one of the misleading points mentioned or suggested in the pro-smoking videos. The tables below summarize the misleading information in the pro-smoking videos and lists the extracted arguments of the targeted PSAs that were chosen for that video. For example, a targeted PSA for a pro-smoking video that talks about false equivalencies (e.g., "Everybody seems to be dying from cancer. You get cancer from anything […] from drinking tap water [...] ice tea […] everything's going to give you cancer") would be a PSA that compares the number of deaths caused by smoking to the number of deaths caused by other behaviors. Specifically, three targeted PSAs were chosen for each pro-smoking video. Note that there are overlaps in the PSAs chosen within category.

Targeted PSAs for Social Acceptance Pro-Smoking Videos

Pro-smoking videos (Social acceptance)	Targeted PSAs
 Hollywood/Celebs Smokers by JolyTracyLynOfficial This video shows a compilation of different celebrities smoking, which may imply that smoking is prevalent and socially desirable. This video may be problematic because a lot of youth identify with celebrities.	*Glamour Pool* By showing wealthy, beautiful women smoking, television portrays smoking as sexy and glamorous. Yet actresses who do smoking scenes do not really smoke. They are disgusted by the habit. *The Pitch* Hollywood has helped big tobacco sell cigarettes to teens for decades. *I'm an Actor* 80% of leading actors smoke in movies, when in real life only 1/3 of them smoke.
 KC smokes a whole cigarette in record time by Will Presley  man smokes a whole cigarette in one drag by finallyitshere  1 cigarette 1 drag by Jorge Murillo In each of these videos, a young man smokes a whole cigarette in one drag in front of friends. Social approval is apparent from the anticipation and cheering of friends around him.	*Outside the Bar* People don't want to be around smokers. Women do not find it attractive. Quit to avoid public disapproval. *Models* Cigarette advertising might lead you to believe that cigarettes make you attractive and popular. But you don't need cigarettes to be those things. You don't get to be champions by taking cigarette breaks. *House Party* Smoke from your cigarettes hurts those around you, including friends and pregnant women. Therefore, smoking can make you unpopular.

Targeted PSAs for Misleading Claims Pro-Smoking Videos

Pro-smoking videos (Misleading claims)	Targeted PSAs
 How To Smoke A Cigarette And Look Cool (REAL VERSION!!!) by swordfish3r's channel In this video, a young man talks about the benefits of smoking: Getting a raspy voice to sing like someone, getting extra time off work because you get more breaks, and looking cool. This video teaches you to inhale as much of the cigarette and hold it in as much as you can to look cool.	*Lung* Every cigarette you smoke damages your lungs. Your lungs absorb the smoke and rot. This will make you short of breath. *Infect Truth: Singing Cowboy* Smoking may not kill you, but it can cause other serious health problems, such as losing a lung, your tongue, or having a hole in your neck. Tell others the facts about smoking. *Donuts* When you take a cigarette break, you never know what you might miss out on, like the simple joy of donuts in the coffee room.
 Warning Labels on Tobacco Products - RANT by HaveASmokeAndRelax  Smoking is good for you! Rant. by johnantinarelli These two videos contain false equivalencies which downplay the negative costs of smoking. In each of these videos, a man equates the danger of smoking to everyday activities such as drinking, eating fatty foods, walking down the street, taking the subway, driving a car, drinking tap water, drinking ice tea, etc.	*The Reality: 480,000 People* In seven years, over 322,000 people were killed in car accidents in the U.S. In just one year, at least 480,000 people die from smoking related causes in the U.S. *Dummy* Smokers say that they are in control of smoking and that walking down the street, driving, eating fast food is all dangerous. However, in Idaho, big tobacco spends $52 million a year on marketing. *Tobacco Kills - Daily Dose* Over 400,000 Americans die from tobacco each year. This is more than the deaths caused by suicide, traffic accidents, AIDS, murder, illicit drugs, and alcohol combined.
 The Pros of Smoking Cigarettes by Spa Week	*#FinishIT | Smoking Gap | truth* Smokers earn less than non-smokers. Don't let big tobacco's products control your paycheck. *Donuts* (duplicate)

In this video, a woman talks about the benefits of smoking: Smokers get promoted more quickly than non-smokers (based on a "study" published in the NYT) and earn more money, smokers can meet single smokers at bars, smoking can keep you thin, smoking forces you to take a break, etc.	When you take a cigarette break, you never know what you might miss out on, like the simple joy of donuts in the coffee room. *Gala Event* Although you may think that cigarettes make you sexier, making it easier to meet people, smoking causes impotence in men.

Non-Targeted PSAs. Non-targeted PSAs are anti-smoking PSAs that are less relevant to the pro-smoking videos in that they do not target any of the specific arguments made in the videos. The non-targeted PSAs were closely matched to the targeted PSAs such that at the aggregate level, the two sets of PSAs are similar in terms of structure and format. When possible, the non-targeted PSAs were taken from the same campaign as the targeted PSAs. The following table lists the targeted and non-targeted PSAs and the rationale for choosing them.

List of Targeted and Non-Targeted PSAs

Targeted PSAs	Non-targeted PSAs	Why the PSAs are similar
Glamour Pool By showing wealthy, beautiful women smoking, television portrays smoking as sexy and glamorous. Yet actresses who do smoking scenes do not really smoke. They are disgusted by the habit.	*Critics Say* Cigarette smoking causes 3 million deaths annually. The Tobacco Industry doesn't care about the deaths it causes.	- Acted out - Very similar in terms of format ("movie" format) - Narrative
The Pitch Hollywood has helped big tobacco sell cigarettes to teens for decades.	*Job Interview* Tobacco executives would even consider marketing cigarettes to their kids. Quit smoking now.	- Acted out - Similar situation (pitching a movie vs. a job interview) - Narrative
I'm an Actor 80% of leading actors smoke in movies, when in	*Lungs Giveaway* Instead of giving out free smoking gear, tobacco	- Acted out - Same campaign; same series ("Florida

real life only 1/3 of them smoke.	companies should be giving out lungs.	Tobacco Control Program - Truth") - Exactly same teens, same context
Outside the Bar People don't want to be around smokers. Women do not find it attractive. Quit to avoid public disapproval.	*Bar* Secondhand smoke contains 63 chemicals proven to cause cancer, which can give new meaning to the idea of "a killer night out."	- Acted out - Similar setting (bar & pool)
Models Cigarette advertising might lead you to believe that cigarettes make you attractive and popular. But you don't need cigarettes to be those things. You don't get to be champions by taking cigarette breaks.	*Hockey - Coolest Game on Earth* Hockey's been called the coolest game on earth. While hockey players take chances on the ice, there is one thing they won't do - smoke.	- Talking head - Both are older ads that depicts depict sports players - Non-smokers telling kids not to smoke
House Party Smoke from your cigarettes hurts those around you, including friends and pregnant women. Therefore, smoking can make you unpopular.	*Date* Smoking can interfere with your social life and cause embarrassing moments. If this hasn't happened yet, it will.	- Acted out - Similar situation – embarrassing moments that smoking can cause (social vs. personal embarrassment)
Lung Every cigarette you smoke damages your lungs. Your lungs absorb the smoke and rot. This will make you short of breath.	*Artery* Every cigarette you smoke does harm to your body and your heart. Even at a young age, you can still have heart damage from smoking. To avoid further damage, quit now	- Same campaign; same series - Very similar in terms of format - Non-narrative - Similar MSV score (18 vs. 22) - Similar AS score (29.36 vs. 31.28) - Non-narrative
Infect Truth: Singing Cowboy Smoking may not kill you, but it can cause other serious health problems, such as losing a lung, your tongue, or having a hole in your neck. Tell others the facts about smoking.	*Infect Truth: Sodium Hydroxide* Sodium hydroxide, a caustic chemical found in cigarettes, is found in many hair removal products. Tell others the facts about smoking.	- Same campaign; same series ("Infect Truth") - Very similar in terms of format - Acted out - Similar MSV score (10 vs. 8)
Donuts	*Jumbotron*	- Acted out

When you take a cigarette break, you never know what you might miss out on, like the simple joy of donuts in the coffee room.	Nobody wants to breathe your smoke.	- Similar MSV score (9 vs. 11)
The Reality: 480,000 People by The Real Cost In seven years, over 322,000 people were killed in car accidents in the U.S. In just one year, at least 480,000 people die from smoking related causes in the U.S.	*The Reality: If Nobody Smoked by The Real Cost* If nobody smoked, we could prevent at least 480,000 deaths from smoking & exposure to secondhand smoke each year in the U.S.	- Same campaign; same series ("The Reality") - Very similar in terms of format (words appear on screen with background) - No characters - Non-narrative
Dummy Smokers say that they are in control of smoking and that walking down the street, driving, eating fast food is all dangerous. However, in Idaho, big tobacco spends $52 million a year on marketing.	*Time Clock* Tobacco marketers spend big bucks in Idaho to keep you on their schedule.	- Same campaign, same series ("Project Filter") - Non-narrative - Ends with similar counterindustry message
Tobacco Kills - Daily Dose Over 400,000 Americans die from tobacco each year. This is more than the deaths caused by suicide, traffic accidents, AIDS, murder, illicit drugs, and alcohol combined.	Customer - Daily Dose Every 8 seconds, big tobacco loses a customer. They die.	- Same campaign; same series ("Daily Dose") - Non-narrative - Both focus on numbers but only the targeted PSA has the false equivalency argument
#FinishIT | Smoking Gap | truth Smokers earn less than non-smokers. Don't let big tobacco's products control your paycheck.	*#FinishIT | truth* Dogs and cats are twice as likely to get cancer if their owner smokes.	- Same campaign; same series ("#FinishIT") - Very similar in terms of format - Multiple cuts - Unusual colors - Fast paced - Non-narrative
Gala Event Although you may think that cigarettes make you sexier, making it easier to meet people, smoking causes impotence in men.	*Funeral* Although you may think that smoking helps you cope, if you don't quit soon, your cigarettes will eventually kill you.	- Similar MSV score (26 vs. 21) - Similar AS score (27.11 vs. 30.22) - Both have graphic imagery, surprise ending - Both depict "events"

Control PSAs. For stimulus materials in the non-related ad control, PSAs (instead of commercial advertisements) were selected in an attempt to make them more comparable to the other conditions. The PSAs were carefully chosen so that they were (a) not concerned with healthy/unhealthy behavior (e.g., underage drinking, drugs); (b) not concerned with risky behavior (e.g., drinking and driving); and (c) not concerned with peers or peer pressure (because they can prime smoking; e.g., anti-bullying). The PSAs also had to be relevant to a younger audience.

PSAs listed on the Ad Council's PSA Central website were chosen. Specifically, three 30-second PSAs from the recycling campaign sponsored by "Keep America Beautiful" and two 30-second PSAs from the reducing food waste campaign sponsored by the "Natural Resources Defense Council" were chosen as controls.

Design

This study is a between-subjects experiment with four conditions: (a) targeted ad condition, (b) non-targeted ad condition, (c) non-related ad control condition, and (d) no ad control condition.

Proposed Conditions

Condition	First video		Second video	
	30-sec ad (Forewarning)	Message	30-sec ad (Forewarning)	Message
Experimental groups				
(a) Targeted ad condition	Targeted anti-smoking PSA	Social acceptance pro-smoking video	Targeted anti-smoking PSA	Misleading claims pro-smoking video
(b) Non-targeted ad condition	Non-targeted anti-smoking PSA	Social acceptance pro-smoking video	Non-targeted anti-smoking PSA	Misleading claims pro-smoking video
Control groups				
(c) Non-related ad control condition	Environmental PSA	Social acceptance pro-smoking video	Environmental PSA	Misleading claims pro-smoking video
(d) No ad control condition	—	Social acceptance pro-smoking video	—	Misleading claims pro-smoking video

After providing informed consent, participants will answer screening questions on age and smoking susceptibility to confirm eligibility in terms of our predetermined demographic quotas. All eligible participants will be randomly assigned to one of four conditions.

Prior to viewing the videos, participants will fill out a pre-test questionnaire on some personality characteristics. The purpose of this is to keep participants from guessing what our study is about. The cover story will be that we are developing an algorithm to make video recommendations based on people's characteristics.

At the exposure phase, all participants will be told that they will be viewing two videos that we think they would be interested in. All participants will view two randomly assigned pro-smoking videos (one social acceptance pro-smoking video and one

misleading claims pro-smoking video in random order). The type of advertisement participants receive at the beginning of each video will be dependent on the condition they are in. With the exception of the *no ad control* condition, each participant will receive two combinations of advertisements and pro-smoking videos. See above *Proposed Conditions* table for further details.[7]

After viewing the two pro-smoking videos, participants will complete a short distractor task. Finally, the post-exposure questionnaire will contain some smoking-related questions and evaluation questions on the two videos that they saw. After a two-week delay, participants will be given a version of the post-exposure questionnaire again. All participants will be debriefed.

Measures

Smoking-Related Questions

Beliefs. Participants will see a list of statements about smoking and will indicate their degree of agreement with each statement on a 5-point Likert-type scale with answer options ranging from 1 (*very unlikely/strongly disagree*) to 5 (*very likely/strongly agree*). Beliefs will be adapted from Brennan and colleagues' (2013) study of identifying promising themes and beliefs for youth smoking. Belief themes include "youth susceptibility to the health effects of smoking," "injunctive social norms from peers," "social perceptions," etc. (Brennan et al., 2013). See below for a list if belief items.

[7] Note that this specific design is employed because it is closest to the YouTube environment where viewers see 30-second advertisements before they see the actual video.

List of Themes and Belief Items

Themes	Belief items
Addiction	- If I smoke *even one or two puffs*, I will be controlled by smoking - If I smoke *even one or two puffs*, I will be unable to stop smoking when I want to - If I smoke *even one or two puffs*, I will become addicted to cigarettes - If I smoke *even one or two puffs*, I will become addicted to nicotine - If I smoke *even one or two puffs*, I will eventually need to smoke even more
Youth susceptibility to the health effects of smoking	- If I smoke *even one or two puffs*, I will be just as likely to damage my body as an adult smoker would - People my age are just as likely to harm their health as older people
Expression of independence	- If I smoke *even one or two puffs*, I will show that I am independent - If I smoke *even one or two puffs*, I will be making my own decisions
Injunctive social norms from peers	- If I smoke *even one or two puffs*, others my age will accept it - If I smoke *even one or two puffs*, my friends will accept it - If I smoke *even one or two puffs*, others my age will disapprove
Social perceptions	- If I smoke *even one or two puffs*, I will be able to show others that I'm not afraid to take risks - If I smoke *even one or two puffs*, I will gain friends - If I smoke *even one or two puffs*, I will look mature - If I smoke *even one or two puffs*, I will get respect from others my age - If I smoke *even one or two puffs*, I will be unable to go places that don't allow smoking (reverse) - If I smoke *even one or two puffs*, I will look immature (reverse) - If I smoke *even one or two puffs*, I will be unpopular (reverse) - If I smoke *even one or two puffs*, I will lose friends (reverse) - If I smoke *even one or two puffs*, I will look uncool (reverse) - If I smoke *even one or two puffs*, I will look stupid (reverse) - If I smoke *even one or two puffs*, I will not look confident (reverse) - If I smoke *even one or two puffs*, I will lose respect from others my age (reverse)
General social norms	- If I smoke *even one or two puffs*, I will be more like everyone else - If I smoke *even one or two puffs*, I will be doing what most others my age are doing

Note. Reference: Brennan, E., Gibson, L., Momjian, A., & Hornik, R. C. (2013). Identifying potential target beliefs for a youth-focused smoking prevention mass media campaign: Final findings and recommendations for 13-17 year old non-smokers. (CECCR Working Paper Series). Philadelphia, PA: Penn's Center of Excellence in Cancer Communication Research, Annenberg School for Communication, University of Pennsylvania.

Attitudes. Attitudes toward smoking will be measured using five items on a 7-point semantic differential scale that consists of a set of bipolar adjective pairs such as "bad/good," "unenjoyable/enjoyable," "unpleasant/pleasant," "foolish/wise," and "harmful/beneficial." Higher scores indicate more positive attitudes toward smoking.

Social norms. Social norms were measured using an adapted version of Park and Smith's (2007) previously-validated scales that measure different types of norms. Responses were measured using three items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). A single item from each type of personal norm was used: Subjective norm ("it is expected of me that I smoke"), personal descriptive norm ("most people whose opinion I value smoke"), and personal injunctive norm ("most people whose opinion I value would approve of my smoking"). Higher scores indicate greater normative perceptions about smoking.

Intentions. Participants' intentions toward smoking will be measured by averaging a 4-point scale items asking participants' intentions to smoke cigarettes and/or any other tobacco products within the next 30 days.

Thoughts. Participants' thoughts regarding the videos will be measured. This question will be asked with a time limit (2.5 minutes) with the thumbnail of each video presented above the question. Instruction wording will be adapted from traditional thought-listing measures (Cacioppo, Von Hippel, & Ernst, 1997; Petty & Cacioppo, 1977) as the following:

> We are now interested in what you were thinking about when you were watching the [first / second] video. You might have had ideas all favorable to the video, all opposed, all irrelevant, or a mixture of the three. Any case is fine; simply list what it was that you were thinking during the time you were viewing the video. Ignore spelling, grammar, and punctuation. You will have 2.5 minutes to write. We have deliberately provided more space than we think people will need, to ensure that everyone would have plenty of room. Please be completely honest. Your responses will be anonymous. The next page contains the form we have prepared for your use to record your

thoughts and ideas. Simply write down the first thought you had in the first box, the second in the second box, etc. Please put only one idea or thought in a box.

Video Evaluations

Perceived effectiveness. Perceived effectiveness will be measured using Nan's (2013) 7-point semantic differential scale of advertising persuasiveness. Participants will be asked their overall attitudes toward the videos they saw. Response options include "negative/positive," "unfavorable/favorable," and "dislike/like." Higher scores indicate more persuasiveness.

Novelty. Perceived novelty will be measured by adapting measures from previous studies (e.g., Kalyanaraman & Sundar, 2006). Participants will be asked to rate how strongly they agree with statements that information in the video is (a) new and (b) surprising on a 5-point Likert scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate that the videos are perceived as being more novel.

Engagement. Engagement will be measured using ten items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The scale combines items from transportation (e.g., "my attention was fully captured"), perceived similarity (e.g., "the person in the video is similar to me in the way he or she thinks"), and empathy (e.g., "I felt the person/people in the video was/were interesting"). Higher scores indicate more engagement with the video. The scale is adapted from Kim and colleagues (2012), who provided evidence for the scale's validity and reliability (alpha = .90).

Emotion. Emotional responses will be measured by asking participants how much of each of the following words described how they felt while viewing the video.

Participants will be asked to rate 11 items on a 5-point Likert-type scale with answer options ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Positive emotional responses included hopeful, proud, enthusiastic, eager, and motivated. Negative emotional response included worried, guilty, disgusted, sad, regretful, and angry.

Defensiveness. Defensiveness will be measured with four items on a 4-point Likert-type scale with answer options ranging from 1 (*not at all*) to 4 (*very much*). Higher scores indicate more defensiveness. The question stem will ask "To what extent do you believe the information presented in the video" and response options included "is exaggerated," "is dishonest," "tries to manipulate me," and "is accurate."

Analysis Plan

Multiple ordinary least squares regression analyses will be conducted to examine conditional differences between treatment and control. Specifically, I will test if there is a significant effect of treatment (i.e., exposure to anti-smoking in-video advertisements) compared with the two control conditions on outcomes of beliefs, attitudes, social norms, and intentions associated with smoking (RQ1-4). Next, I will compare the effectiveness of the targeted PSAs and non-targeted PSAs on beliefs, attitudes, social norms, and intentions associated with smoking to see if there is a main effect of specificity on these various outcomes (H1-4). All tests will be run on Stata 12.0 (StataCorp, 2011).

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